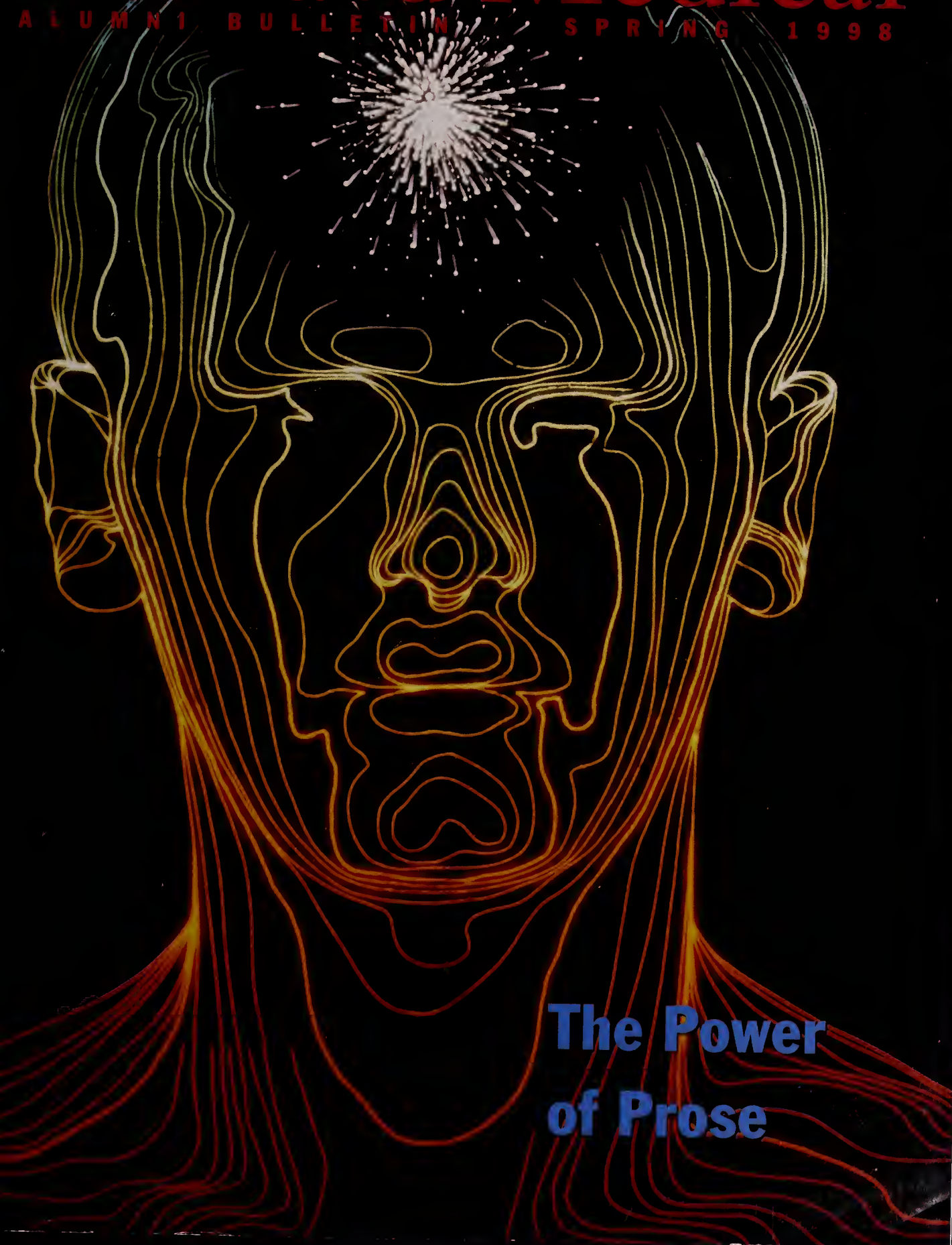


Harvard Medical

ALUMNI BULLETIN SPRING 1998



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- ☒ USE OF CHEMOTHERAPY — 1942
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- ☒ SUCCESSFUL BONE MARROW TRANSPLANT — 1968
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- ☒ PSA BLOOD TEST FOR PROSTATE CANCER — MID 1970S
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- ☒ BALLOON ANGIOPLASTY — 1981
- ☒ TREATMENT FOR SICKLE CELL ANEMIA — 1995
- ☐ CURE FOR MULTIPLE SCLEROSIS
- ☐ CURE FOR DIABETES
- ☐ CURE FOR CANCER
- ☐ PREVENTION OF HEART DISEASE
- ☐ PREVENTION OF BIRTH DEFECTS
- ☐ CURE FOR AIDS

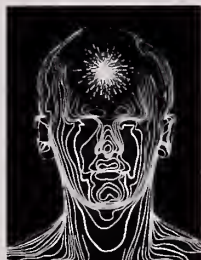
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The sciences of life and disease, the arts of living and healing—these four pursuits come to a busy intersection. The contributors to this issue of *HMAB* offer meditations on the perils of navigating life in the middle of traffic. In doing so, they also ponder the difficulty of finding a place for reflective dialogue about what it means to both feel and know, to try healing the hurts of others and still have a life of one's own.

The scientific paper, as such, is one of the great forms of Western literature, right up there with the sonnet and the op-ed column. But there can be no disrespect in observing that as a form it can carry only part of even just the intellectual freight, let alone the emotional, generated by the professions of research and patient care. As Rita Charon, Athena Andreadis and Nancy B. Kaltreider variously observe, physicians and researchers often resort to more-or-less disreputable forums—"Star Trek," "E.R.," psychotherapy, novels good and bad, memoirs, gossip, marital squabbles—in their effort to work out the meaning of it all.

This may not be a bad thing. High-minded efforts to make some subjects reputable—sex, politics and religion, to take a few examples that come to mind—seem to me (a) doomed and (b) no fun. There is, however, great peril in attempting to leave everything else under the peer-reviewed rug of science. So we offer some examples in this issue of physicians and scientists reading and writing seriously and comically in modes other than the research report about topics that do not always lend themselves to proper controls.

Our readers have indicated a liking for historical accounts and reminiscences in *HMAB*, and this may reflect some of the same impulse. As Robert K. Funkhouser and Morris J. Karnovsky's articles in this issue illustrate, the pleasure of history is partly in knowing what couldn't be tactfully recounted at the time.

With this issue we say farewell and thanks to Janet Walzer, our associate editor since 1996. In her too-brief time with us, Janet has been a talented writer and editor, as well as a caring colleague. We wish her well in her new endeavors.

William Ira Bennett '68

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Letters

Worcester's Finest Legacy

It was fascinating to read Alfred Worcester's account of his experiences as an HMS student in the 1880s, which appeared in the winter 1998 issue. The short biography that follows the piece does not mention his finest legacy: the small volume, *The Care of the Aged, the Dying, and the Dead*.

This book, full of wisdom, wit and compassion, has inspired me throughout my career. It was published in 1935, and my copy is from Charles C. Thomas, publisher, 1961.

Would it not be good if this little book were placed in the hands of every HMS graduate, alongside the diploma? It would not only be a guide, but also a sign that despite the astonishing technical advances in our field, the fundamental truths of the doctor/patient relationship have not, indeed, will not change.

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Pulse

First Charlton Professor Named

Walter Frontera, chair of the Physical Medicine and Rehabilitation Department, has been named the first Earle P. and Ida S. Charlton Professor of Physical Medicine and Rehabilitation. This department, which has received \$2.75 million from the Ida S. Charlton Charity Fund, was formed two years ago by HMS and supporting hospitals.

Frontera investigates the physiology and biochemistry of muscles in aging, exercise, disuse and pathological conditions. He has authored 40 scientific articles and book chapters in the field of physiology and physical rehabilitation, and is currently developing a muscle cell physiology laboratory at Spaulding.

"The field of physical medicine and rehabilitation is dedicated to the study of human movement, its molecular basis, cellular determinants, biomechanical correlates, clinical relevance, psychological perceptions and functional consequences," explained Frontera. "Physical and mental health and functional independence are intrinsically related to all dimensions of human movement."



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Earle P. "Chuck"
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Upstairs/Downstairs

While the Rare Books and Special Collections Department will be moving down to the basement of the Countway Library of Medicine, Thomas A. Horrocks, the department's newly-appointed curator, plans to give it a much higher profile.

Horrocks comes to HMS from Pennsylvania, where he was director of historical programs and services at the College of Physicians of Philadelphia from 1992 to 1997. He is both a librarian and a historian. In his position at Philadelphia he directed both the History of Medicine Library, a collection totaling more than 300,000 volumes, one million manuscripts, and 20,000 prints and photographs, and the Francis Clark Wood Institute for the History of Medicine. He received his MS in library science from Drexel University and is currently a doctoral candidate in American history at the University of Pennsylvania. He succeeds Richard J. Wolfe, who served as the curator for the department for more than 30 years.

The relocation of the Rare Books and Special Collections Department from the fourth and fifth floors of the Countway, to L2, will yield several benefits: it will double storage capacity (largely through the use of compact shelving); allow for an enlarged exhibition space; a reception area; a reading room; private offices for permanent staff; and a seminar room, among other changes.

When the Countway Library opened its doors in 1965, the Rare Books and Special Collections Department was practically an afterthought. Horrocks says that the department has grown dramatically over the past three decades and now houses one of the greatest medical collections in the world. Speaking from his fifth floor office-with-a-view, "Half the materials would have to be off site



Tom Horrocks

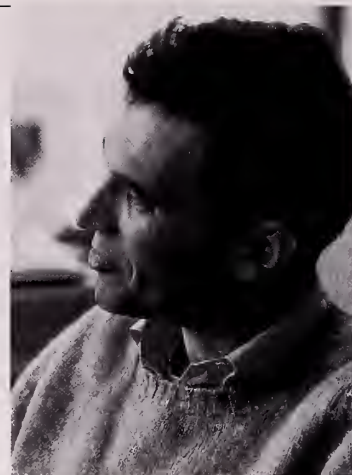
photo by Steve Gilbert

if we stayed here." The renovated department, he says, will "enjoy all of the modern amenities in terms of technology, while keeping faith with the appeal of tradition. We are thinking progressively in terms of making these marvelous collections accessible."

While a variety of people make use of the Rare Books collection, including professional historians and graduate students, HMS students and physicians, Horrocks plans to expand the department by making its materials more accessible and by reaching out to the medical and scholarly communities both at Harvard and beyond. "We can provide an historical perspective on many of today's important issues. We should be here not only for the professional historian, but for the physician and medical student as well."

One of Horrocks' short-term goals is to put the cataloging records of the department's extensive collection of medical manuscripts on-line. A long-term goal is to digitize the over 100,000 photographs and prints for use by on-line researchers. This technological step will have the added advantage of preserving these fragile historic materials.

In addition to modernizing the Rare Books and Special Collections Department, Horrocks plans to schedule a number of classes and seminars in the new space. He also hopes to create research fellowships in association



Robert Coles

with the department. He believes that all these measures, in addition to the unique value of the collections, will contribute to making the Rare Books and Special Collections Department at the Countway a national center for the history of medicine.

Honor at the White House

Robert Coles, HMS professor of psychiatry and medical humanities, received the nation's highest civilian honor in January at the White House. Coles, along with 14 other Americans, received the Medal of Freedom by President Clinton for his work with underprivileged children and his writing about how children experience the world.

On being asked about the award, Coles replied, "I've been extremely lucky to know and work with children in this and other countries for most of my life. I've tried to focus on those who are isolated from the professional knowledge and experience of people like myself-the poorest and most disadvantaged kids. I urge the pediatricians I know, and the medical students I teach, to do the same."

Coles, who is also the Agee Professor of Social Ethics at the Graduate School of Education, has written more than 55 books and 1,200 articles. He received the Pulitzer Prize in 1973 for his volumes of *Children of Crisis*.

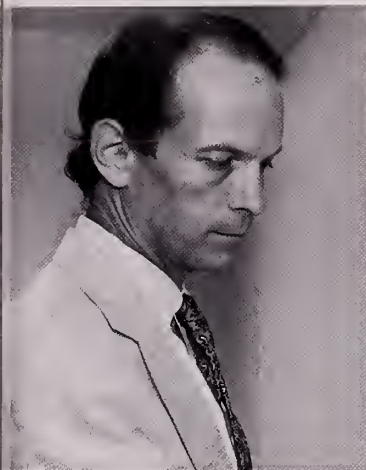


photo by Barbara Steiner

Paul Cleary



photo by Barbara Steiner

Joseph Majzoub



photo by Steve Borack

Morris Karnovsky

Mentoring

In December 1997 the annual A. Clifford Barger Excellence in Mentoring Awards were given to Paul Cleary, professor of health care policy and social medicine, and Joseph Majzoub, associate professor of pediatrics at Children's Hospital.

Upon presenting the award to Cleary, Barbara McNeil '66, chair of health care policy, noted, "In many

ways, awards like these are more important than the Nobel Prize; directing the next generation of educators, researchers and medical leadership is a magnificent achievement."

Assistant dean for faculty development and diversity, Joan Reede, presented the Lifetime Achievement in Mentoring Award to Morris Karnovsky, the Shattuck Professor of Pathological Anatomy. After receiving

the award, Karnovsky spoke briefly about the future of mentoring. He warned today's faculty to not mentor students "in our image." Instead, faculty should help students to fight against skepticism, handle the pressure for secrecy in labs, and seek originality. "The hot fields of today," Karnovsky observed, "may be gone tomorrow."

In the spirit of both "Star Trek" and "Star Wars," the 1998 Second Year Show, "Back to the Suture," time-traveled to the year 3,000. Harvard Medical School finds itself ranked at the bottom of the *Earth News & Galaxy Report*. A rebel alliance forms to combat student malaise and the evil computer MAL.



Benchmarks

The Intein Bag of Tricks

by Gabrielle Strobel

Have you ever heard of an intein? Or an extein, for that matter? The names suggest a link to proteins. Yet while the latter are familiar even to most lay people, few scientists have ever heard of their obscure relations.

That is slowly changing. In last October's *Current Opinion in Chemical Biology*, a special issue devoted to enzyme mechanisms, Henry Paulus, HMS associate professor of biological chemistry and molecular pharmacology, and others review the rapidly growing knowledge about these

bizarre molecules. And recent talks Paulus delivered at Harvard and elsewhere are meeting with heightened interest, whereas only a year ago, most biochemists he talked to had no idea that these things exist, he said.

Inteins are parts of proteins that cut themselves out of the whole protein entirely on their own accord. This phenomenon has become known only in the past few years, and it is perplexing because most major alterations to a protein require a second protein, such as a protease, and other cofactors, such as energy in the form of ATP.

Self-splicing proteins, therefore, represent a fundamentally new way of protein modification, says Paulus, who works at the Boston Biomedical Research Institute. "All of the intein's

aspects—its biological effects, its evolution, mechanism, protein structure—are highly unusual," says Paulus.

Beyond their peculiarity, self-splicing proteins may open up new practical possibilities. Already, they have inspired the development of a technology for purifying genetically engineered proteins for commercial and research applications. Moreover, inteins might provide a convenient target for drug development against tuberculosis.

Most genes contain intervening DNA sequences—the introns—that do not belong in the final protein. The body cuts them out of the RNA before protein translation. In some cases, however, an intervening sequence does get translated into the protein, where

Could Inteins Yield New Antibiotics Against Tuberculosis?

Henry Paulus hit upon an opportunity to put basic intein research to practical use when he learned that pathogenic mycobacteria, which cause tuberculosis and leprosy, harbor an intein in a crucial protein, while their harmless brethren do not.

This suggested that disabling these inteins might weaken the virulence of these killers. Tuberculosis is a resurgent disease that claims 3 million lives worldwide each year. Drug-resistant strains are popping up in many localities.

Mycobacterium tuberculosis infects macrophages, which attack the invader with reactive oxygen molecules. To fight back, mycobacterium expresses the RecA protein, which contains an intein that needs to splice itself out before RecA becomes active.

The Paulus lab has developed an experimental system to test substances for their ability to inhibit RecA protein splicing. They hope that a pharmaceutical company will soon take over the search for these sorely needed types of novel antibiotics.

Study Broadens Understanding
Harvard researchers have shown that a long-known but underappreciated component of the immune system plays a central role in coordinating the body's front-line defense against bacteria.

In the November 13 *Nature*, Michael Carroll, associate professor of pathology, and Stephen Galli, professor of pathology at Beth Israel Deaconess, report that in experimental animals, it is the complement cascade, a set of soluble proteins, that activates mast cells to protect the body from an otherwise deadly abdominal infection.

The study furthers the understanding of how the body fights back against acute bacterial infections that can lead to sepsis. This all-out infectious pandemonium is a major clinical problem because it is frequent, often fatal, and without satisfactory treatment.

Moreover, the paper joins two separate lines of research into a clearer view of how the body uses inflammation to ward off bacteria immediately after they invade—weeks before the

acquired B and T cell reactions that most people associate with immune responses even come into play.

The first line of study concerns the mast cells, known for triggering allergic reactions, including asthma. But they likely did not evolve for that reason, and their physiological roles remained less clear until 1996, when other researchers reported that mast cells are a key link in the defense against septic peritonitis.

Researchers knew what mast cells do once they are activated—they dump their granules, releasing a mix of cytokines. Galli's group showed that activated mast cells secrete tumor necrosis factor alpha. TNF- α calls in other white blood cells, which kill the microbes. But these reports raised the question of how the mast cells knew about

it forms essentially a foreign miniprotein inside the protein proper.

First reported in 1990, there are now 45 known examples of such inteins, all of them in unicellular organisms. In 1993 Paulus teamed up with researchers at New England Biolabs, Inc. in Beverly. These researchers had used an intein from thermophilic archaebacteria—hardy creatures that thrive in the boiling heat of geysers and geothermal vents at the bottom of the ocean—to study how the intein manages to extricate itself from the protein. By maintaining this organism at low temperatures, they were able to study the normally fast enzyme reactions in slow motion.

Intrigued by their proof that the intein needed no help from other mol-

ecules to part with the extein, Paulus suggested a mechanism for how this could happen and, in the ensuing collaboration, studied the intein's feat step by step. In papers published over the past four years, the researchers showed that the mechanism consists of sequential rearrangements of chemical bonds that release the intein with no net loss of amino acid bonds. That is equivalent to having one continuous piece of tangled wool and removing, say, its middle third without actually cutting the wool.

This enzyme mechanism is not the only intriguing feature of inteins. They also are parasites, researchers think. Once discharged, the intein acts as yet another enzyme, a so-called homing endonuclease. That enables it

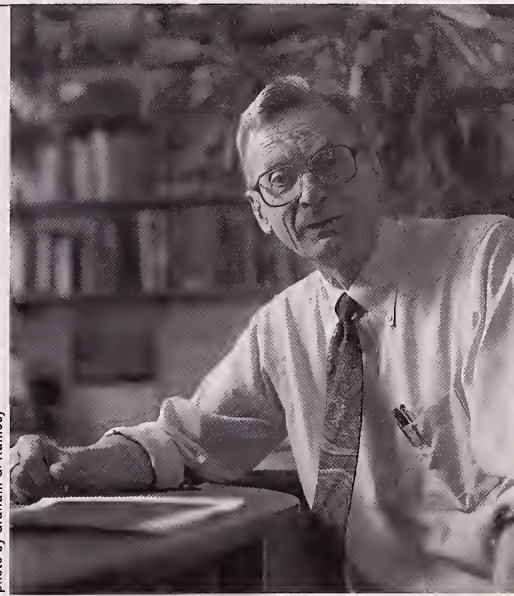


photo by Graham G. Ramsey

to propagate the intein by mediating the transfer of intein DNA into other genes. In that sense, "inteins probably are the most primitive types of infectious agents," says Paulus.

Interestingly, many primitive RNA introns perform similar feats, says

the infection. The present study closes that circle, yielding a near-complete picture of the line of communication.

The researchers did so by inducing, in mice, the spillage of intestinal bacteria into the peritoneum, a condition that resembles a ruptured appendix in humans. They used two strains of knockout mice made by Carroll's group. Each strain lacked a protein key to one of the two main biochemical pathways of complement. (Complement comprises roughly 20 proteins, which can activate one another in sequential steps.)

The results were dramatic. The infection killed all mice lacking complement within one day, whereas four out of five control animals survived. An injection of the missing complement protein rescued the doomed mice.

The second line of investigation in this paper concerns the importance of complement to the immune system as a whole, adding to a recent flurry of papers that has begun buffing up the image of this seemingly dull member of the body's armed forces.

Textbooks focus mostly on one role of complement; that is, the ability of five of its members to form a complex that essentially goes bacteria, killing them. But that limited view "misses the exciting stuff," says Carroll. Work in his and other labs has established a more elaborate picture of complement. According to this picture, complement communicates with the other arms of the immune system in important ways to coordinate early and late responses to pathogens.

In the present study, the scientists show that complement ties together the beginning and the end of the host reaction. First, fragments of complement protein C3 activate mast cells through specific receptors. These fragments also attach to the bacteria so that later, when neutrophils arrive at the scene, they "sense" these fragments through their own complement receptors, enabling them to eliminate the bacteria effectively.

In three recent papers, Carroll and collaborators at Harvard and elsewhere reported another example of complement's broad role in immunity. Complement proteins, they found, bind to B lymphocytes, the cells that make antibodies. Indeed, B cells must interact with complement to develop the molecular memory that defeats pathogens more

swiftly when they infect a second time. In ongoing work, Carroll and others on the Quadrangle are studying ties between complement and T cells as well as other, seemingly separate, arms of the immune system.

G.S.

Benchmarks

Paulus. Called "selfish" DNA, they also parasitize genes and are capable of leaving the RNA by their own devices. The first such "catalytic RNA" ever described, which won Thomas Cech a Nobel Prize, was, in fact, an intron from a unicellular organism.

Inteins have other tantalizing characteristics. Like most parasites, they do not damage their host genes: once expressed, they get out of the way, leaving behind a functional protein. Indeed, Paulus believes that inteins originally evolved to serve an important biological function by controlling protein activation. The intein ensures that an enzyme is first synthesized in an inactive form, and then gets activated by self-splicing, a mechanism that comes in handy in embryonic

development.

Though word about inteins is now spreading, the field is still wide open, he adds. Most biological implications of this eccentric enzyme remain completely unexplored.

Gabrielle Strobel is a science writer in the HMS Office of Public Affairs.

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Forbes, Feb. 1996

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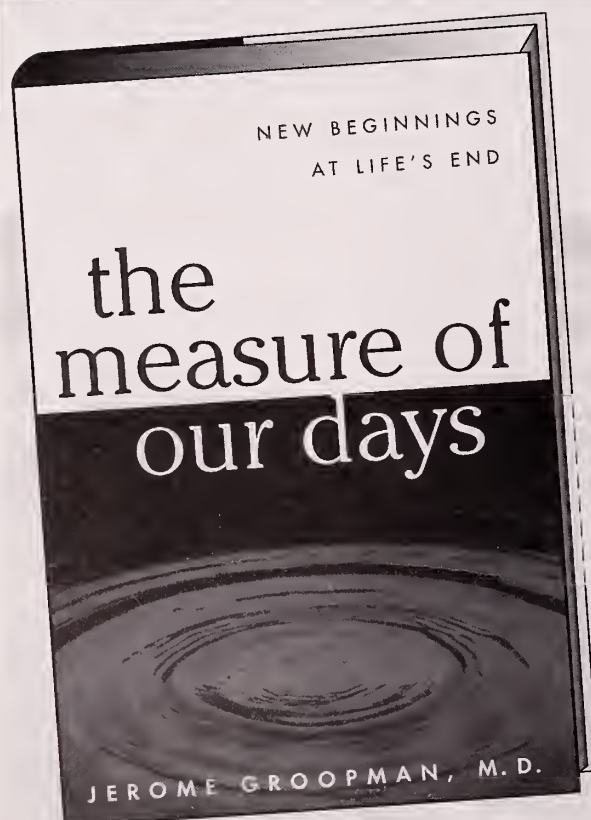
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Book Mark

THE WOMEN'S CONCISE GUIDE TO EMOTIONAL WELL-BEING AND THE WOMEN'S CONCISE GUIDE TO A HEALTHIER HEART

by Karen Carlson '80, Stephanie A. Eisenstadt, MD and Terra Ziporyn, PhD

Harvard University Press, 1997

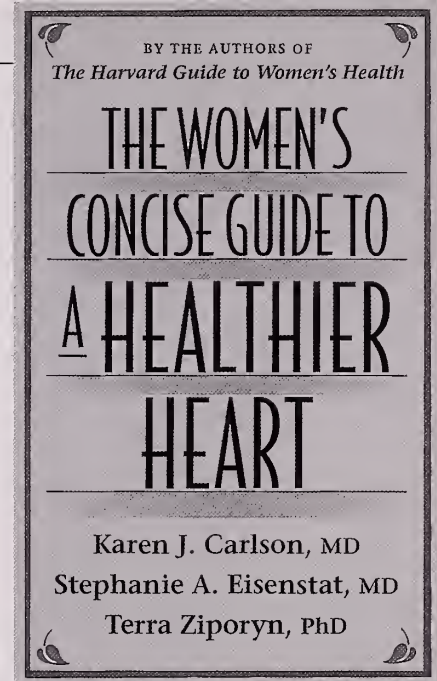
by Elissa Ely

A health book for laywomen should be read by a laywoman. The finest reading laywoman I know is also a master of fractal-like lists, a study in nuance between the lines, a caretaker of children and plants, and (I am personally pleased to add) the only living being who can organize my drawers as successfully as she used to organize my life. For these and other reasons, the maintenance of my mother's physical health and robustness of spirit is paramount.

She was visiting for the week, folding the baby's clothing by season and function, when two books arrived: *The Women's Concise Guide to a Healthier Heart* and *The Women's Concise Guide to Emotional Well-Being*. Both are by the authors of *The Harvard Guide to Women's Health*.

The books are laid out in question-answer format. I leafed through them while she was seasoning casseroles for the freezer, and found them straightforward, undense and digestible. They give basic information on cardiac conditions, risk factors and prevention in women; there are diagnostic and treatment descriptions of the major psychiatric syndromes, as well as brief discussions on violence and sexuality. There is also a chapter in each book entitled "Taking Control" that homes into self-help. I was pleased, in a Board-review way, to find there was not much new to me.

Then I handed my mother a cup of weak tea, made from the single dogged

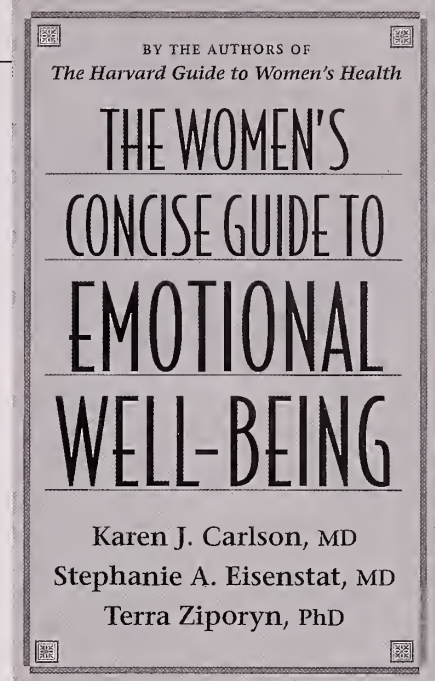


bag she reuses through the day, and she put her measuring spoons down. Here is the review of the finest reading laywoman I know.

It begins, enthusiastically, with the heart. My mother found *The Women's Concise Guide to a Healthier Heart* a book "with no mumbojumbo," and a worthy reference before seeing the doctor; a book for a nearby shelf, although not the bedtable. She especially appreciated the constant reframing towards women of findings traditionally aimed towards men. "I always knew there were lots of vague 'heart problems,'" she said, "but I never knew what they were."

The systematic approach to illness by diagnosis, workup and treatment left her feeling respected, in a collegial way, for the intelligent reader she is; yet, the writing was not so technical that her mind drifted. She was impressed with the many charts and diagrams so common in medical texts but uncommon in laymen books, and was particularly frightened by a page of illustrations about the sequence of plaque formation. "There goes whipped cream," she said.

In her layman's medical bookcase, *The Women's Concise Guide to Emotional Well-Being* would be shelved somewhat lower than the heart book. "It's the kind of book you pick up if someone tells you you're neurotic or a



hypochondriac... or if you're very interested in mental illness, which I'm not." She again appreciated the specific female focus, but found the handling of the topics somewhat generalized, adding, "every other week there's a column on this stuff in the paper." As all readers do, she flipped first to the sections most personally intriguing ("insomnia—I could have written it") but, having done so, found the whole less useful than its parts.

We got down to brass tacks. What, I asked, are you going to change about yourself now? What have you learned that has surprised you into some new resolution? In other words, how does this information make a difference, really? "Well," she said, "for me, I happen to be aware of the things I don't do properly. Diet. Exercise. Stress control. I know most of what I should do."

Yes, yes, true for us all, but have these books had an impact? Have they caused you to worry enough about something that you must urgently change it?

"Absolutely," she said firmly. "I feel so badly that you work so hard."

Elissa Ely '88 is book review editor of the Alumni Bulletin and a practicing psychiatrist. Her mother, Paula Manaly, is very active in hospice work in Connecticut, as well being a mother and grandmother.



“Elliott”

from *The Measure of Our Days*

by Jerome Groopman

“JERRY, IT’S ELLIOTT. IN JERUSALEM. I KNOW IT’S EARLY, but it’s an emergency.”

Emergency. I felt a burst of adrenaline race through my body.

It was still dark in the bedroom. The glowing red digits of the night-table clock read 5:03 AM, making it just after noon in Jerusalem.

“What is it, Ell? How can I help?”

I imagined the worst—Elliott’s wife, Susan, or son, Benjamin, injured by a terrorist bomb or a car accident.

“I have a growth of lymph nodes in my chest. It’s interfering with my breathing. A few hours ago, my doctor told me I need surgery. What do I do?”

Elliott was transformed in my mind from one of my closest and oldest friends into a “patient.” I mentally organized his particulars into the format of a clinical case: a forty-three-year-old previously healthy Caucasian male, non-smoker, working as a journalist in the Middle East, with enlarged lymph nodes in his chest, considered for surgery.

“Ell, tell me first what happened, from the beginning,” I evenly replied, following the principle that the best history of an illness is elicited in the patient’s own words. That way, the physician does not prejudice the recounting and keeps an open mind to the full breadth of possible diagnoses.

He had first become aware of something wrong eight weeks before, during his regular early morning jog on the hills between West and East Jerusalem. It was a temperate spring day, the sun hardly over the horizon, the cool nighttime air from the Judean desert still lingering over the city. Elliott started at his house in the German Colony, at his usual pace, aiming to complete his regular four-mile course. But at the very first ascent, at the Bethlehem Road, he had been forced to stop.

“My chest felt tight, heavy, like there was a weight pressing on it. I couldn’t get enough air to make it up the hill. I figured I was coming down with a cold, and walked back home.”

I asked Elliott if he had had any fever or chills. None

photo by Stuart Darsch

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whatsoever; he had checked his temperature when he returned from the aborted run, and several times since. Cough or sputum? He had recently developed a dry cough, but without phlegm.

As I listened, I was creating a list of diagnoses in my mind. By my own convention, I always started with the worst category. In the case of a mass of lymph nodes in the chest, it would be cancer.

...

Elliott had begun to worry when the chest tightness persisted through the week. He called his general practitioner, Jeremy Levy. But the doctor, also an American who had emigrated to Israel, was on military reserve duty out of the city. The covering physician had Elliott come to the office, but there he was not examined, not even his chest, just handed a prescription for erythromycin for a presumed bronchitis.

"Even though you had no fever or sputum?"

"Correct."

After two weeks on the antibiotic, there was no change in his symptoms. His regular doctor was still away. This time, the covering physician listened to his lungs and heard some wheezing. Elliott was told he might have asthma and was prescribed an inhaler. This afforded some relief, but he still couldn't make it up the hill when he tried to jog again.

"Finally Dr. Levy returned from the army. He ordered a chest X ray. After two months of this growing inside me."

I maintained my calm and even voice, even though I felt angry and anxious. My friend, a reliable person complaining for two months of a disabling symptom, had been incompetently evaluated. Critical time may have been wasted. For a fleeting moment I saw my father, gasping in the throes of heart failure, a general practitioner standing confused at his bedside. My father's life was lost because of medical mistakes. This memory painfully gripped me, and I forced myself to disengage from it and return my focus to Elliott.

"Did you have any blood tests? Did Dr. Levy describe what was seen on the chest X ray?"

"I'm not anemic and my white count is O.K. Susan had me get a copy of the X-ray report. It says, and I'm translating from the Hebrew, so give me a minute: 'Enlarged mediastinal lymph nodes—' What's mediastinal?"

"Just medical jargon for the central area of the chest under the sternum, the breastbone."

"Right. 'Enlarged mediastinal lymph nodes measuring eight centimeters in maximum diameter and surrounding'—better English would be 'encasing'—'the trachea and extending to the aorta. Compression of the right bronchus. Lung fields otherwise clear.'"

"I knew I should not deviate from my policy of honesty with a patient, even a patient who was like a brother to me."

I paused to assess the information. The dimensions of the mass, the compression of his airway, and the adjacent surrounding unscarred lung, taken with the absence of fever or sputum, made cancer overwhelmingly likely.

I began to review my diagnostic list of cancers, but felt my concentration slipping. It was not the early hour and interrupted sleep. Rather, my focus was clouded by a collage of intersecting memories—Elliott and I lingering over coffee in his Manhattan apartment, talking about his aspirations as a writer at *Time* and mine as a future doctor; Pam in her bridal gown and me

in a tuxedo joined with Elliott in a triangular embrace at our wedding; Elliott gently dabbing drops of sweet red wine in my firstborn son Steven's mouth to "anesthetize" him before his ritual circumcision.

The collage was erased by the sound of Elliott's quivering, plaintive voice.

"Jerry—what do I do?"

I paused a moment, then said: "Put Susan on the phone."

Susan, an émigrée from California, worked as a political and business consultant and was a coolheaded master of logistics. Her native American optimism had been mixed with an acquired Israeli toughness, so in a notoriously bureaucratic country like Israel she was able to make things happen quickly and efficiently.

"Hi, Jerry," Susan began. "We really don't know where we are yet. I checked out the surgeon Dr. Levy recommended at Hadassah Hospital. He's said to be good. And I know enough powerful people there to make sure Elliott gets special attention. But we want the best, the very best, so maybe it makes sense to come back to the States."

The "very best" in clinical medicine was not only expert physicians and technologically advanced hospitals. There were many of those to choose from, throughout the world. Serious illness demanded more. It was like a wild rodeo bronco, often exploding in unanticipated directions, stubbornly bucking to throw you off its back. The "very best" required tight and determined hands on the reins. There needed to be attention to every detail and nuance of diagnosis and treatment. Even seemingly minor errors—a misread CAT scan or a too rapidly administered medicine or the lack of an available catheter—could allow the situation to spiral out of control and be catastrophic. Who would exert such control in Elliott's case?

"I can't make the decision for Elliott and you. Medicine is quite good in Israel, although many new drugs are not yet available there. You need to be sure that the specialist in charge will be totally focused on Elliott's case, covering every aspect of the situation. You also have to consider the

practical dimensions—your jobs, your insurance, Benjamin's school, and a host of other things holding you there."

Susan paused but a moment.

"But we don't have you, Jerry. We're coming to Boston. Expect us the day after tomorrow. I'll arrange to get seats on the next El Al flight."

* * *

IT ALL HAPPENED in rapid succession. They arrived early Tuesday morning, just after my sons, Steven and Michael, left for school. Elliott was anxious and pensive, an ashen shell of his ebullient self. I embraced him forcefully, and could feel a weak shiver pass through his body as he tried to return my hug.

Susan quickly occupied herself with organizing their luggage in the upstairs playroom where Pam had opened the couch into a sofa bed. Benjamin, a cute three-year-old with jet black hair and almond brown eyes like his mother, immediately fell asleep after the fifteen-hour plane trip.

Elliott and I sat in tense silence during the car ride to my office, each absorbed with his own thoughts of what the day would hold. I had designated myself as his physician of record and arranged for blood tests, a CAT scan of the chest, and appointments with Peter Draper, a thoracic surgeon, and Tom Cramer, an anesthesiologist, in anticipation of surgery the following day. Before sending Elliott off on his schedule, I thoroughly examined him.

I moved Elliott's long auburn hair off his neck so I could palpate for lymph nodes. He still affected a bohemian look, the same look he had when we first met two decades before. We had been introduced by a mutual friend, Anne Albright, who brought us together because she was struck by how similar we were.

"You could be brothers, so tall, with those deep-set, soulful eyes," Anne had teased us over mugs of French roast coffee one Sunday morning in her Riverside Drive apartment.

But it was not just our physical resemblance that had struck Anne. She said it was how much we shared in spirit—our appetite for information, our sense of humor, our loquaciousness. Elliott and I had blushed at her bold praise.

"You look worried," Elliott stated as I removed my hand from his neck.

Just above his collarbone was a matted hard tongue of tissue. It resisted the compressive force of my fingertips. The mass was growing up now, from the mediastinum to the apex of his thorax. I had noted a subtle bulge in the veins in his neck, and a slowing of their rhythmic flow.

I hesitated in responding, not wanting to tell him what I observed. But I knew I should not deviate from my policy of honesty with a patient, even a patient who was like a brother to me and whose condition caused me deep anguish. If I did not tell the truth always, I would not be trusted when I had a truth to tell.

I explained that the veins in his neck were dilated, and this indicated "superior vena caval syndrome." The vena cava, the large vein that drains the blood from the upper body, was being compressed by the mass of nodes in his chest before it emptied into the right atrium of his heart. That backed up circulation in the brain and could cause increased intracranial pressure, manifest first as a headache.

"I've had a constant headache over the last few days, but figured it was stress."

I agreed that his headache could be due to stress, but the compression of the vena cava was contributing as well. By tomorrow we would diagnose the nature of the mass, and begin to treat it. That would decompress the vena cava.

Elliott looked knowingly into my eyes, and then returned my honesty with his own.

"Jerry, don't let me die."

I shuddered at his words.

I had cared for many patients who had intuited their own deaths. Sometimes it was obvious to all, to patient, physician, family. Then the disease was widespread, the treatment failing. But occasionally there was no clinical sign that pointed in that final direction. I had come to believe strongly in how a patient feels and reads his body. Beyond any objective tests, blood chemistries, cardiograms, or CAT scans, a patient's sense of impending death often proved true.

I gripped Elliott's exposed shoulder tightly, holding fast as I offered words of comfort. He was exhausted from the trip and from worry, I said, and should not rely on grim feelings in such a state. We did not yet know the cause of the enlarged lymph nodes. Once we made the diagnosis, we would embark on our course of action.

But as I continued with my reassurances, I studied the distant look in his eyes, and wondered whether he had indeed seen the arrival of life's last visitor.

"SCALPEL"—"SCALPEL"; "Clamp"—"Clamp"; "Suture"—"Suture."

We were well into the second hour of the operation. Peter Draper, the thoracic surgeon, had finished dissecting between the vital structures of the mediastinum—heart, aorta, lungs—and had just reached a dense band of inflamed fibrous tissue overlying the mass of nodes.

I stood slightly away. It was too distressing to watch a person whom I understood as I understood myself—as thoughts and feelings projected in the external form of the body—exposed as a conglomeration of tissues and vessels seeping blood and lymph.

I looked upward from the operative field. Elliott's lids were closed over his china blue eyes and his face rested in a motionless mask. He had been transformed by the anesthetic into that intermediate state between what we know as life and what we imagine as death, where consciousness and feeling are suspended. In this state, I pictured his soul wait-

ing in the anteroom of time, ready to pass back into life should the surgery succeed, or exit on its voyage with death. As I gazed at Elliott's immobile form, I silently prayed for his return to life.

Elliott's life. I knew its intimate details, learned during twenty years of friendship.

He had been a child prodigy from an Orthodox Jewish family in Brooklyn, excelling in languages, mathematics, music. His father, whom I still deferentially referred to as "Professor Ehrlich," was a renowned scholar of medieval Jewish history; his mother was the principal of a Hebrew high school.

Elliott was one of the first students from his yeshiva to go to Harvard, where he graduated magna cum laude in American studies. Following in his family's professorial tradition, he began a doctoral program in Colonial history at Yale. But he found the academic life too quiet and staid, the dimensions of the ivory tower too small.

So he left Yale for a job at *Time* in New York. For a while Elliott had found it exciting. It wasn't the New York he had known—Brooklyn with its sedate, tree-lined streets with two-family houses and elderly denizens chatting on the sidewalks. It was Manhattan, with all its intensity, grit, and ambition. At *Time* he found many like himself, educated at Ivy League colleges, poised to conquer the larger world. It was when Elliott was at *Time* and I was a medical student at Columbia that Anne Albright introduced us.

Although Elliott had made a living at *Time*, what his parents called a "decent" living for a single person in Manhattan, after three years he felt unsatisfied. The thrill of seeing his name among several on a joint byline waned, and he did not advance to a regular national column or produce an article that was considered for a national prize.

In June 1976, as I was leaving New York for my internship in Boston, Elliott quit the magazine and set out for L.A. He hoped Hollywood would provide what Harvard and Yale and *Time* had not.

"You bring yourself wherever you go," his father reminded him. I recalled remarking to Elliott at the time that it was the kind of advice my father, had he been alive, would have offered.

I heard Peter Draper sharply announce that he had snared the upper lip of the mass and that the attending pathologist, Ned Waterman, should enter the operating theater. I watched Peter deliver a glistening cube of tissue from the deep cavity of Elliott's open chest. He placed it on a sterile gauze sponge and then cut it into three equal pieces. Ned Waterman quickly moved his pathologist's forceps onto the field and distributed each piece into a different receptacle: one flash-frozen in liquid nitrogen; one placed in a plastic container with fixative; the last dispersed

"I knew at that moment I could not be Elliott's doctor."

into a cell suspension in a saline-filled tube.

Peter Draper looked up and nodded to me. It was a signal that all was proceeding smoothly. I relaxed a bit, feeling the tension in my legs ease, and returned to my thoughts of Elliott.

. . .

"Look at those cells," Ned Waterman said.

Gazing into the aperture, I found it hard to comprehend that the tissue I was studying under the microscope was a part of Elliott. The magnified field should have been recognizable but was confusing, almost surreal. Large cells swirled and danced like the intoxicated moon and stars in the frenzied paintings of the mad Van Gogh.

"It's a T-cell lymphoma," Ned Waterman tersely concluded.

My heart sank.

. . .

I paused, my mouth dry, feeling slightly nauseated. I envisioned the next steps. We would clinically "stage" his lymphoma, assessing by CAT scan and tissue biopsy where, beyond his chest, the cancer cells might be growing. Although it might be confined to the mediastinum, given the size of the nodes and the two-month delay in diagnosis, I suspected we would find it elsewhere.

Elliott then would require very intensive treatment. At least five different chemotherapy drugs administered together for nine months, followed by two years of so-called maintenance therapy with three more agents. The aim was to destroy every last lymphoma cell. The treatment would bring him to the cusp of death, damaging much healthy tissue—in bone marrow, liver, skin, mouth, and bowel—in order to purge the cancer completely.

My mind stumbled in its clinical mode as I considered the prognosis of a "forty-three-year-old Caucasian male, previously healthy, with T-cell lymphoma presenting as an 8-centimeter chest mass." The numbers would not hold together. Each time I approached the statistics on long-term survival, less than 50/50, my heart sank again.

I knew at that moment that I could not be Elliott's doctor. For the first time in my career I had reached my limits as a treating physician. I was unable to function with the clinician's necessary analytical detachment. I realized that my inability was not just because of our closeness. It was also because Elliott was too much a mirror of myself.

His situation had sparked memories of my father's death, of my youth as a student, and of my dreams as a physician-in-training. The arrival of Benjamin and Susan had made me consider how Pam would manage with our children if I were the one suddenly stricken with a life-threatening disease. In the operating room I had averted my eyes because I feared seeing myself as he was then, exposed for what we all

are: vulnerable flesh and blood. Later, during his therapy, I would wonder how the poisonous drugs flowing into his veins would feel flowing into mine. And—I shuddered at the thought—I knew I would perceive the final throes of his death as a vision of my own.

I realized I could not trust myself to be his primary care provider, to walk each morning into his hospital room and see the suffering that had to be if he had any chance of surviving—the vomiting and diarrhea and hair loss and bleeding and fevers and infections and mouth blisters and skin sloughing and a host of other side effects from the treatment. I feared that his physical suffering and psychological anguish would color my judgments and cause me to make a mistake—a mistake that could cost him his life.

I would never forgive myself for that, as I never forgave the physician who failed my father. That physician did not know his limits. I knew that my father might have died even in the most competent hands and the most modern hospital. But then I and my family would have known that all had been done that could have been done, and we would live without added anguish or regret.

I could think more clearly now that I understood the basis for my inner conflict.

I decided I could not, would not, remove myself entirely from Elliott's case and medically abandon him. I desperately wanted to help.

I arrived at a solution. I would offer myself as a "physician once removed." My scientific knowledge and technical expertise would be brought to bear at each step of Elliott's illness as they might be useful. After the clinical staging of the lymphoma, I would identify a competent and committed oncologist. With this specialist, I would help set the treatment strategy and advise on the medical response to problems and complications—as they undoubtedly would occur.

I STOOD in the surgical recovery room, grasping Elliott's pale hand. Susan leaned over, wiping beads of perspiration from his forehead with a damp cool cloth. She took the news of his cancer without flinching. I sensed she had expected it from the start.

"Elliott will defeat it," Susan forcefully asserted. "I know him, how tough and determined he can be."

Elliott looked at her with measured appreciation. He whispered, "I'm ready to fight. I want to live. Above all, for you and Benjamin. And my daughter-to-be."

I looked at her with surprise, and then understood. Susan had seemed heavier, her taut facial features subtly expanded, her waist wide. I thought it was the first changes of middle age, she being in her early forties.

Susan smiled softly at me.

"I'm just in the first trimester."

"Mazel tov," I congratulated them, wishing literally "good luck." The traditional phrase hung heavily between us. We would need all the luck possible for their unborn

daughter to know her father.

Later that evening in his hospital room, after Elliott had taken his first nourishment and the effects of the anesthetic waned, we began to discuss the logistics of his care. I began by outlining the further staging that needed to be done, two separate biopsies of his bone marrow and an MRI scan of his brain followed by a spinal tap. We would begin a short course of radiation to the mass tomorrow to free the vena cava and restore the free flow of blood from his head.

I hesitated and then, in faltering speech, began to discuss the question of where he should receive his nine months of chemotherapy.

Elliott looked knowingly at me. Before I could broach the issue of my being his primary physician, Elliott asserted that it didn't make sense to be treated in Boston. Now that the situation was under control, we could think more pragmatically.

He reached for my hand, gripping it with considerable force. He said he knew I would be there for him every step of the way, and my presence meant a great deal, more than he could express. But someone else, whom I knew and trusted, should take over his case.

I rallied, feeling grateful he had read my feelings and relieved me of my conflict.

We analyzed the options of which location and hospital and medical team would be the "very best," and concluded Elliott should go to Alta Bates Hospital in Berkeley, California. A warm-hearted and skilled colleague, Dr. Jim Fox, directed its outstanding program in blood diseases and cancer. Jim, I knew, would make the personal commitment to Elliott's care. A key factor in this choice was Susan's family. Her parents lived in Sacramento and owned a condominium in San Francisco. Susan and Benjamin would stay there while Elliott was receiving treatment. When the new baby arrived, there would be the support and resources of nearby grandparents.

...

Beyond clinical assistance, Elliott looked to me for hope. I told him all the complications he had suffered from the chemotherapy were reversible, and we were very much on track with the lymphoma regimen. He began to ascribe to such words of support and reassurance a deeper significance, as if I were privy to a world of certainty beyond that of our senses. Susan, the hard-driving political operative, surprised me by also taking up this line. She regularly ended our joint discussions of his condition with the assertion "If Jerry says it will be O.K., then it will be O.K., Elliott."

I felt deeply uncomfortable in such a role. I knew all too well how desperate we become facing life-threatening illness and its toxic treatments, and understood how we grasp at straws, wanting to believe that the doctor, with credentials and experience, can see the future clearly.

I tried to defuse their statements while still being encouraging, to gently restate the truth as I knew it, in sci-

entific terms. I reiterated that the sum of the clinical data so far indicated that Elliott's chances were increasingly good that he would survive, but there were still major hurdles to overcome.

After his third course of the five-drug chemotherapy regimen, the mass of lymph nodes disappeared in his chest. After the fifth course, no lymphoma cells were seen on his repeat bone marrow biopsy.

With each positive advance, Susan and Elliott reaffirmed that I, like an oracle, had predicted everything would turn out fine, and my words were being proven true.

Elliott completed his eighteen months of intensive therapy. He then underwent complete restaging, with CAT scans of his chest and abdomen, bilateral bone marrow biopsies, and a spinal tap. There was no evidence of lymphoma. After so many invasive examinations, Elliott offered: "I always tested well, and this one was open-book."

Elliott was declared to be in complete remission. It would take five years of follow-up before it was safe to state he was cured—after that time, relapse was very rare.

"I will live with that uncertainty," Elliott asserted. "If I've learned anything from developing this disease, it is the fundamental uncertainty of all of life."

TWO YEARS LATER, in early June 1994, Elliott and his family visited Cambridge for his twenty-fifth Harvard reunion. I had never met his daughter, Tikva, now three years old. A petite and outgoing girl, she greeted me with a clever smile. Born after the fifth cycle of Elliott's therapy, when the lymphoma disappeared from his bone marrow, she was given her name as an expression of thanks. In Hebrew, tikva means "hope." Susan said the name embodied their tenacious optimism.

Elliott walked briskly with his family and me through Harvard Yard. Despite his artificial hip, he only occasionally depended on his cane to negotiate the inclines in our path. He was wearing sharply cut clothes he had purchased at Banana Republic in Berkeley to celebrate his complete remission: a white collarless shirt, beige linen pants, and a matching vest. His hair was thick and long, tied artfully in a pony tail. Susan remarked with a loving grin he was "Samson with his strength back."

...

ONE YEAR AFTER his Harvard reunion, Elliott had another opportunity to visit Boston. In addition to writing his biweekly column, he was now engaged in frequent travel as a public speaker.... He would come up to Boston midweek

"If I've learned anything from developing this disease, it is the fundamental uncertainty of all of life."—Elliott

after his speech. Almost as an aside, he asked me to recheck his blood counts. On a routine visit last week with Dr. Levy, his general practitioner, his white blood cell count was noted to be just below normal.

"I'm at the tail end of a cold which I picked up from Tikva. Jeremy Levy thought this might have slightly depressed the number. You think it has anything to do with the lymphoma?"

I said I didn't. I agreed with Dr. Levy. Respiratory viruses often caused a minor diminution in the leukocyte count.

Elliott arrived looking strong and energized. There was a bronze color to his face from the Middle Eastern sun.

His chest and shoulders were broad

from his new passion, swimming. We embraced forcefully, feeling the triumph that marked his survival. Pam and the kids welcomed him, as usual, with warm kisses.

Elliott did justice to a hearty homemade dinner, and rose early to read *The New York Times*. We spoke of the continuing move toward peace, how the redevelopment in the West Bank was proceeding, and the chances that Rabin's Labor Party would triumph in next year's elections.

When we arrived at my office, Youngsun greeted Elliott with great excitement, and spent much time inspecting his photographs of Benjamin and Tikva.

Two hours later, I sat with Ned Waterman, the same pathologist who had reviewed the biopsy of Elliott's lymphoma. We systematically scanned the slide made from a single drop of Elliott's blood, which held thousands of white cells. Swimming among the normal white cells were several large ragged forms. These unkempt cells had bloated nuclei and bright pink splinters littering their cytoplasm. I looked at the face of my colleague across the microscope, how his brow arched and the muscles of his cheeks tightened. The diagnosis could be made by a first-year medical student, the morphology of the large, distorted cells was so distinctive. Elliott had acute leukemia.

I closed my eyes, the residual image of the leukemic cells lingering on my retinae. Then all I saw was deep blackness. I felt hollow, as if the darkness before my eyes had coursed down into the core of my being and emptied me of feeling. There was no anger, no pain, just a cold numbness, like the unfeeling shock of a person swiftly cut by a sharp knife who has no sensation of the wound.

Despite my emotional void, I immediately understood on a rational plane what had happened.

"Treatment-related leukemia" was the term applied to Elliott's condition, the cruel outcome of modern chemotherapy, which provided a lifesaving result at first

only to trigger, years later, a second potentially fatal disease in an unlucky few. The drugs that Elliott was given to destroy the lymphoma had damaged the DNA of his normal bone marrow cells. Most of these cells had died from the trauma, unable to survive with an impaired genetic program; a few had accumulated, by chance, the necessary mutations to lead to the opposite of cell death—the unrestricted growth of cancer.

I returned to my office, where Elliott was waiting for me. We had planned to go to lunch at Rebecca's Cafe, the gourmet fast-food place near the medical school. He had spent the morning at the Harvard Coop buying T-shirts for the kids and wandering around his beloved campus.

"It's incredible how fast they grow," Elliott remarked as I entered the office. "Last year at the reunion, we bought them all sorts of Harvard outfits, and they've outgrown everything."

I agreed, saying kids grew like happy weeds, and then sat down. I looked into his soft blue eyes, knowing what they would soon see.

"Ell, I just returned from reviewing the slide of your blood test."

I paused. The cold emptiness that I had felt was now quickly replaced by searing pain.

I was tempted to hide behind euphemisms, to say there were some "abnormalities" noted and "further tests" would be needed. I had thought that might ease him into the news, the awful crushing news, that after all he had endured, he now faced more, much more—a treatment as intensive and battering as any that existed in clinical medicine. To definitively eradicate the leukemia and cure him, chemotherapy would not be enough. He now required a bone marrow transplant.

But I knew, as before when I had informed him of this T-cell lymphoma, that it was best for him to know everything, as soon as possible in honest detail.

. . .

After I told Elliott he had leukemia and explained what it meant, he seemed to move all the clinical science to the side, and surprised me with his response.

"What is your choosh, your sense, Jerry? Am I going to live?"

Choosh is a biblical Hebrew word, meaning "sense" or "feeling." It is onomatopoeic, capturing the sound of a rush of breath that emanates from the deep reaches of the spirit. It is a word that speaks not of rational deliberation and assessment, but of inner vision.

I paused, not expecting to have a choosh but an opinion as a sober clinician, one drawn from weighing the factors that went in his favor and those that did not.

*"What is your
choosh, your sense,
Jerry? Am I going
to live?"*

But within me I had felt, not calculated, a reply.

"My choosh is good. I believe you will make it, that you're going to live."

I stood from my chair and hugged him tightly, tears now streaming down both our cheeks.

I wondered if I had gone mad, whether the anticipated pain and loss from imagining his death was so great that, after I rebounded from the numbing shock of the news, my ratio-

nalinity had collapsed and I was retreating into delusion. Who was I to pretend to be a prophet, to have extrasensory perception? What did my choosh mean in clinical reality? Was I indulging myself and my closest friend in a convenient lie?

But it was not a lie. I had felt it, clearly and strongly. Deep inside me was a prevailing calm. I clearly realized all the obstacles and uncertainties that lay ahead—the induction chemotherapy for the acute leukemia, the identification of a compatible match, the preparation with total body radiation for the transplant, the tense waiting to see if the graft of stem cells would "take" in his marrow space and grow to repopulate his blood, then the risk of graft-versus-host disease. All the while, Elliott would be in a tenuous state—without an immune system—vulnerable to overwhelming and often deadly infections. He would be placed in an isolation room with special purified air and food, rare visitors allowed for short times and only under mask and gloves and gown, secluded as completely as possible from our world of ambient microbes while he lived without any bodily defenses.

But all these clinical realities faded under the powerful feeling that he would survive. I did not see light or hear words or otherwise hallucinate. And when I first heard his question, I assumed I would evade addressing it because in medical science choosh was meaningless.

But I had sensed that he would live, and it would have been a lie not to tell him.

[Elliott undergoes intensive chemotherapy for the lymphoma and is now facing bone marrow transplant.]

Later that night the phone rang. I was in the kitchen, unloading the dinner dishes from the washer. It was well past ten, the kids asleep in bed, Pam reading in the den before we would retire for the night.

"Jerry, it's Elliott." His voice was hushed.

"You O.K.? Why are you whispering?"

"I don't want Susan to hear me. She's watching TV in the other room."

He paused and drew a deep breath. "I don't know if I can continue. I don't know if I can go ahead with the transplant."

I could hear him trying to control the quavering of his voice.

"Why not? You've done great so far. You've come through the leukemia treatment beautifully. Your brother Michael is a perfect match. We're almost there."

"I'm not sure why..." He began to sob. "I just don't know...if I can..."

He paused to collect himself, and then continued, his voice still shaking.

"Susan and you and my parents and Michael and Jim Fox—everyone just expects me to do it. But I don't know... if I can fulfill your expectations."

I felt the distance of thousands of miles, the difficulty of finding the right words to reply without the benefit of seeing his face, touching his hand, following his eyes.

"Jerry, the transplant has become in my mind like writing my great novel or my major film script. The expectations that surround me—that have surrounded me all my life—everyone believing I could accomplish great things—it's all now focused on this. I just don't know if I can do it."

I paused to collect my thoughts. It was not my place to explore the degree of success or lack thereof in Elliott's life. That was not the critical issue now. What was critical was having him move ahead with the transplant, his only chance to be cured. I first tried an analytical approach, explaining to Elliott what I thought was happening to him psychologically, hoping the insight would comfort him and bolster his courage.

"Ell, it's normal to be frightened. Especially on the second go. It's like a soldier sent back to the front after surviving a first bombardment. You're still shell-shocked. You lose your nerve. That's natural, normal. I've seen this countless times with other people—a flood of self-doubt, all the secret insecurities rising to the surface and threatening to drown you.

"But you won't drown. We're all there supporting you, not with expectations but with love. I know Susan can be tough and drives you forward. It's her way of coping, her way of trying to keep herself, as well as you, intact."

"You don't understand, Jerry."

I heard him sigh, a desperate, frustrated sigh.

"All my life I was expected to hit home runs, to slug it out of the park. Harvard. Yale. *Time*. Hollywood. But I'm not a home-run hitter. I hit singles—short grounders in the infield and pop flies. This time my life depends on a home run, and there isn't another chance at bat."

...

"Tell me your choosh about the transplant, Jerry." Elliott interrupted, his voice now more even and calm.

I sat silently, calling on my deepest feelings, seeking my inner sense of harmony or disharmony. It was again strange,

*"But deep inside
I had felt an answer,
and offered what
I sensed, not what
I knew."*

because I did not resist his request. On a conscious level I wondered again whether this was all a game, my lack of resistance a way to extricate myself from a situation which had no ready solution. It was like a child's belief in the truth of fairy tales and the power of magic. I thought of the stories I had heard from my Hasidic relatives while growing up, of wonder rabbis, seers, diviners to whom the secret workings of time and space were revealed through angelic visitations and the study of mystical texts, kabbalah. I had

been instructed by my parents to discount such tales as primitive and nonsensical. Was I assuming such a role for Elliott, or for me, or both?

But deep inside I had felt an answer, and offered what I sensed, not what I knew.

"I feel you're going to make it, Elliott. I really do."

* * *

ELLIOTT RETURNED to Jerusalem after the required one hundred days under observation in Berkeley. The marrow transplant had followed a remarkably smooth and uncomplicated course. His brother Michael's stem cells had found their niches in Elliott's emptied marrow space, and over six weeks began to spawn all the cells of Elliott's blood system. The growth factor G-CSF was given to expedite the maturation of the transplanted white cells, which reached normal numbers by week 10. There was no sign of graft-versus-host disease, and the medications that were used to prevent this complication were soon to be tapered off.

We had spoken several times each week during these critical one hundred days. After assessing the progress of the transplant, we discussed the biology and medical science that gave rise to the procedure. Elliott had brought a laptop computer into his isolation room, and in addition to e-mail and writing, had researched the history of the technique on the Web.

The Nobel Prize was awarded in 1990 to E. Donnall Thomas [HMS Class of 1946], now at the Fred Hutchinson Cancer Research Center, for developing marrow transplantation. It was the culmination of a remarkable story. The first eleven patients treated by Dr. Thomas had died within a few weeks. It was an extraordinary act of determination to persevere, to believe that the barriers to transplantation of human bone marrow could be surmounted.

...

Elliott, my beloved friend, husband of Susan, father of Benjamin and Tikva, had been given back his life because of the stubborn commitment to research of physicians like Donnall Thomas. Science did change the world, fundamen-

tally and for the better.

Elliott called me from Jerusalem three weeks after his return to tell me that Susan and his parents were planning "a survival party." Pam and I were invited, although they doubted we could come.

I told him we would celebrate in spirit from Boston, and toast the miracle of science that had returned him to family and friends.

"You saw it all along, Jerry. Your choosh was that I would make it."

I felt uncomfortable. I wanted to celebrate the triumph of medical research, not vague mystical intuitions.

"I don't know what my choosh meant, Ell. I did feel it, but perhaps it was just a delusion, a psychological mechanism to help me cope with the nightmare you were in."

Elliott paused and then replied thoughtfully.

"I've come to believe more in that mystical dimension, Jerry. Isolated all those days, my own cells forever gone, the stem cells of Michael growing into my new blood, I had a strange choosh of my own.

"I sensed it wasn't only coincidence that Anne Albright brought us together, but that she envisioned you as my brother, and then my two 'brothers'—you in spirit and Michael in flesh—saved my life. I felt a visceral connection to you, to Anne, to all the people who have loved and cared for me during my life. I felt this at the moment of the transplant. I felt as if all your spirits were being infused into me along with the marrow. As much as Michael's stem cells revitalized my body, your spirits breathed life again into my soul."

We left it at that, making these mystical experiences a part of the history between us, and moved on to talk about work-related things. ❧

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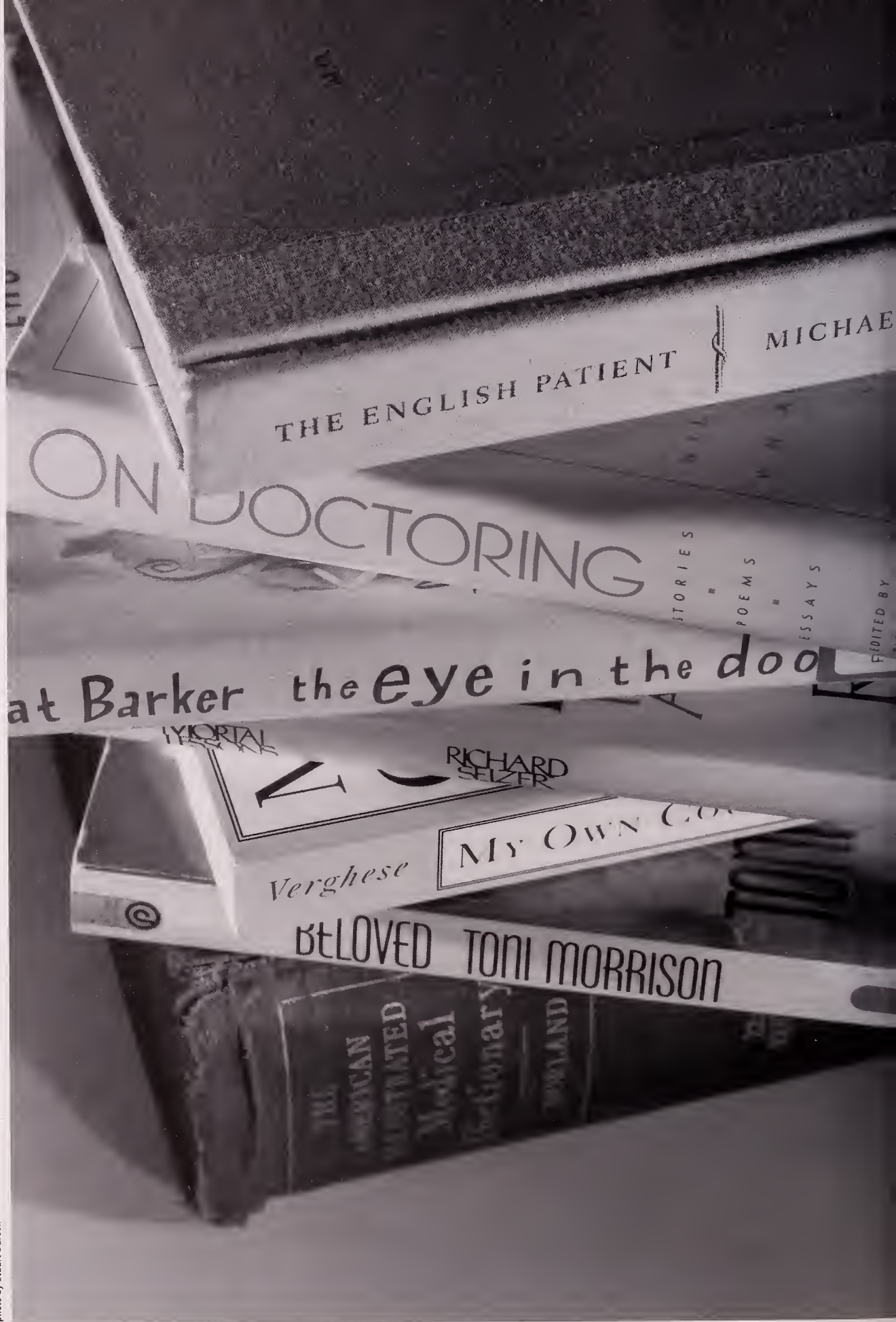


photo by Stuart Darsch

A Consult with Literature

by Rita Charon

MEDICINE HAS ALWAYS LOOKED beyond its conventional boundaries for help in doing its work. No one thinks twice when doctors consult with solid-state physicists or polymer chemists or computer scientists in research or in actual clinical activity, for the non-bio-medical sciences have enormous and evident contributions to make to medical practice. Of late, medicine has turned to the humanities too—history, philosophy, literature, religious studies, jurisprudence, visual arts—not only for inspiration but for methodological grounding as well.

Having grown up in both literature and medicine, I have seen how my two fields—dissimilar enough that some may consider them to cancel each other out—shed striking light on one another. My experience prompts me to generalize a little in suggesting why boundaries around illness, healing, and the self (both of doctor and patient) are changing so fundamentally and then to describe the richness I have discovered in my version of medicine's

boundary crossing. Drawing out the similarities among very diverse scientific and cultural currents may suggest fresh solutions to intractably vexing troubles.

Since literature and science battled it out in Matthew Arnold's "Literature and Science" in 1889 and again in C.P. Snow's *The Two Cultures* in 1959, conversations among intellectual disciplines have increased dramatically, for many disciplines grapple with the same questions: the nature of truth, the stance of the subject, the recognition of self, and the meanings of that which human beings apprehend. University life is blessed with opportunities for multi-disciplinary study in centers for African-American studies, environmental studies, narrative studies and women's studies. The medical center has realigned itself into breast cancer centers, women's health clinics, and chronic pain units, doing more by virtue of having outgrown departmental limits. We aspire to zoneless turf.

Illness too has been transformed by

a vision that sees beyond artificial and outmoded margins. The more we learn about illness, the more we grasp how dynamic are its boundaries and how echogenic are its inner structures. Once conceptualized as a simple encapsulated thing that could be characterized by etiology, pathophysiology, physical findings, symptoms, and appropriate treatment leading either to cure or to chronicity, illness is now recognized to resonate with choices, relations, contradictions, cultural dimensions, spiritual consequences and meaning.

Its boundaries porous and encrypted, illness is not a smooth alien object, sitting still in one organ or another, as the "old" biology suggested. Rather it is an invader of self while simultaneously part of self, gone awry or turned on or sounding off, transmitting and receiving messages, masquerading as nonself, opening and closing gates and channels, dynamically altering the architecture, the language, the economy, and the culture of the bodies and the lives in which it declares itself.

When once we thought that one could marginalize an illness within a life and expect the "rest" of life to proceed as if the illness had never come, now we are beginning to understand that the "rest" of life—even the rest of the body—is irrevocably stamped by the illness, however contained organically or temporally the illness seems to be. Serotonin does not stay in one place and do but one thing; the hyperglycemic self is physiologically unrecognizable for the euglycemic one; T-cells have plans of their own. A first-trimester miscarriage brings grief, all the more inconsolable for the baby's nameless state. A woman never gets over her breast cancer. Childhood trauma never ends.

Illustrations from contemporary literature spell out what I mean to say about illness. A hallmark of postmodern fiction is its intertextuality. The story does not merely get told. Rather, it tells itself, in the voices of many

tellers, by alluding to a pastiche of other fiction and so-called fact. Its meaning is not built on the frame of its plot and the actions of its characters; instead it arises from the juxtaposition of irreconcilable forms of knowing.

The reader of Michael Ondaatje's *The English Patient* (sadly, not the movie's viewer) undergoes not only the experience of having lived with some characters but of having lived within the force-field generated by the tensions between the knowable and the unknowable, the reducible and the irreducible, the "true" and the "untrue." A nurse on the Italian front in 1945, Hana rebuilds her life of mourning not by caring for a soldier burned beyond recognition but by remembering her way back to her own dead father. For the characters and readers of this novel, answers to life questions are more likely to be found in the logic of a desert sand storm or the plan of an archaeological dig than in such conventional sources of wisdom as religion or tradition.

Pat Barker's Great War trilogy (*Regeneration*, *The Eye in the Door*, and *The Ghost Road*), told from the point of view of Dr. William Rivers as he treats shell-shocked soldiers, brings the reader toward the meaning of war and loss by way of the poetry of Wilfrid Owens and Siegfried Sassoon, the 1918 papers published in *The Lancet* by the "real" neurologist Rivers, and the transference produced by the act of reading the novels themselves. That one hesitates to call these texts "novels" is exactly my point: fiction no longer sediments from fact. The sources of meaning these days are found on the boundaries between states or genres or texts rather than in the isolated states or genres or texts themselves.

In Ondaatje's novel and Barker's works, nursing and medicine are chosen as the metaphorical bridges between the implacable events of war, on the one hand, and the characters' inner contradictory states of meaning, on the other. Caring for illness, that is

"Both medicine and literature try to understand chaotic narratives told in words, forms and silences."

to say, in these writers' hands as in real life, unites the world of event with the world of meaning and the world of the body with the world of the text.

Illness, too, is an intertext, declaring itself not with one voice but through multiple (and sometimes contradictory) channels, unrestricted to the physical, mental, autobiographical or the symbolic, but orchestrating all these dimensions every time a person gets sick.

Medicine, after all, sits at that gap between the body and the text. We in medicine are charged with encircling the body with text: names, plots, time frames, predictions, explanations, absolutions. In a profound sense allegorical of all human life, medicine endows biological organisms with storied meaning, raising physical matter out of its immanence and conferring upon it transcendent and singular meaning.

Sometimes, the story is a biological one: the ovary responds to FSH and LH surges by increasing its production of estrogen, leading to release of the egg from its follicle. Other times, the story is an existential one: learning of his advanced lung cancer and unwilling to live with its pain, Mr. Shane chooses suicide. Still other times, the story is a spiritual one: during the acute chest pain of her MI, Mrs. Cruz felt close to an abyss and, in the grip of her fear, recognized the presence of God. And always, the story locates a human com-

munity: despite having suffered physical abuse for years at the hands of her husband, Margaret Holmes devoted herself to caring for him after his debilitating stroke. In these and all cases, illness extends beyond corporeal lines to influence and mobilize all dimensions of the patient's life.

If illness is echogenic and intertextual, so is healing. It must be so. Empathy, to take an important dimension of healing, is not simple. It contains within its echogenic structure such opposites as revulsion, boredom and blame. Not a detachable or elective aspect of the self but rather a resident of the innermost self, empathy transforms both the person experiencing it and the person toward whom it is shone, bathing both in light that reveals and that forgives, crossing divides in the process.

Biomedical scientific knowledge, to take a more manifest dimension of healing, is not merely reductionist reproducible information about the workings of the physical world achieved by a universal, detached observer; instead, as most life scientists now readily agree, its questions, findings and interpretations come from creative epiphanies marked with values, ideals and dreams in response to moral, political and economic forces alongside the scientific ones.

Clinical research even more urgently summons up multiple kinds of knowledge, dealing as it must with such variables as pain, fear, choice, behavior, hope and strength. And medical practice itself is shot through with intertextual echoes, the doctor's and the patient's words and actions profoundly influenced by memories, associations, emotions, beliefs, and the state of being moved by another's suffering.

Here is where my lessons from literature help the ordinary doctor and patient as they sit in a room talking about pain. Taking care of sick people leads us to perform complicated acts of reading and writing: we listen to stories of sickness, interpret them accu-

rately, and act judiciously on their truths. Both medicine and literature try to understand chaotic narratives told in words, forms and silences. They try to cohere random or unruly events and behaviors into meaningful plots about human beings with motives and intentions, whether in aid of diagnostic or discursive truth. They try to interpret the meaning of stories, a meaning that arises always through the actions of both the teller and the listener.

Henry James in his essay "Criticism" described the task of the reader in terms that can equally apply to that of the doctor: "To lend himself, to project himself and steep himself, to feel and feel till he understands and understands so well that he can say." For the great doctor is the one who absorbs what is true and salient through her senses, intimations, hands, brain and imagination, becoming a multilingual sensor who can tolerate ambiguity, be alert for the silent subtext, follow allusions wherever they lead, understand one story in the context of others told by the same teller, and be moved by the story as it becomes part of self. What Henry James says of the writer's task in "The Art of Fiction" is true of the doctor's as well, "Try to be one of the people on whom nothing is lost!"

Medicine, then, cannot be something one does with only one part of the self, the boundaries within each doctor as porous, perhaps, as those around illness or healing. If illness is more like a postmodern text than a nineteenth-century realist novel, then doctoring too is a postmodern undertaking, undermined by uncertainty and randomness while enriched by unimaginable freedoms and echoes among things.

However, for many years, informal dicta of medical practice seemed to hold out an ideal of remoteness and objectivity, warning doctors not to get too close to their patients and implying that the cognitive was the only dimension of the individual to be tapped by practice. Detachment, or

impermeability, was deemed a requirement of objective clinical judgment, as if the surgeon's hand was propped up by a carapace of indifference. Detachment, or impermeability, also was thought to protect doctors from the inevitable pain and suffering of a life lived among sick and dying persons, thereby conserving the doctors for a long life of practice. We modeled feelings as if they were subject to Jenner's laws: in large doses, they lead to florid illness while in minuscule doses, they grant immunity against systemic disease. Maybe a little local irritation at the site of the inoculum.

We are beginning to wonder about such advice. Patients lament that their doctors do not listen to them and turn away from their suffering. Pathographies, or stories of illness, written by such authors as Reynolds Price, Anatole Broyard and Wilfred Sheed recount hurtful episodes at the hands of indifferent and callous physicians. More and more doctors—Richard Selzer, John Stone, Susan Mates, Abraham Verghese, Rachel Remen, Jerome Groopman, Eric Cassell—write about their practices, describing the intimacy they achieve with patients and realizing that their faith, courage, honesty and love contribute as much to good outcomes as do their medicines and surgeries.

Chary of so-called boundary problems in practice (sexual relationships with patients, financial conflicts of interest, and the like) and unwilling to jeopardize their clinical judgment, many doctors feel unable to use the self as an instrument of healing, seemingly not aware of the enormous room between using the power of the self and abusing one's power over the sick. And yet, both the effectiveness of medicine and its rewards for the physician may be proportional to the ability of the physician to achieve engagement rather than detachment, intimacy rather than distance, relation rather than isolation in the care of the patient.

Sick people do not tell strangers

their worst fears easily. I saw a new patient, a man in his mid-40s, who had long-standing debilitating abdominal symptoms that had forced him to change jobs and alter his life at home. Having finally caved in to his family's insistence that he visit a doctor, he appeared wary, held in, well defended against my questions. I was impressed with the amount of pain he had tolerated without complaint.

When it was time for the physical exam, this large, muscular, powerful man stood silently at the sink in the examination half of the room while I continued to sit at my desk, six feet away from him. I did not know what was happening, but I knew not to make a sound. Motionless, I continued to sit with my back to the patient while he, hunched over the sink, tried to gather control over himself. I felt that I was in an Edward Albee play, acutely aware of a great and wordless drama and only waiting for its meaning to be made clear.

After minutes of this tableau, the patient said, "It's because of what happened to me in the hospital when I was a kid." He then allowed the rest of the evaluation, accepted recommendations for treatments and further testing—although at a slower pace than I suggested—and thanked me for my patience as he left. Not needing to know any details about what actually happened to him early in his life, I had crossed a gulf of fear and suspicion by merely being attuned to his wordless needs.

Sometimes the imagination is the only bridge to needed empathy. A woman in her late 60s with mild hypertension and degenerative joint disease had been given benzodiazepines by her former physician to get to sleep. She wanted to stop the medicines, but without them suffered terrible nights and anxious days. Psychotherapy was not an acceptable option for her.

Over the months, she told me about her long abusive marriage. I watched as she gathered the courage to

get a divorce and move into her own apartment, the first time in her life living by herself. When her ex-husband developed cancer, she took him in to her own home, caring for him through his illness.

The only way that I could learn all that happened to this woman was to write it down, making up what I did not know in fact. I would bring “chapters” for her to read at each follow-up visit. “This is what I heard you say. Did I get it right?” Her reading what I wrote, her correcting what I had gotten wrong, and her adding what had been left unsaid eventually led to her being able to write, on her own, the next chapters of her life. Her husband died, and she now is building a new center of meaning for herself, more aware of her own guilt, rage, love and strength than before our work together.

Most medical schools offer courses in medical interviewing, providing students with skills in communicating with patients. Not merely behavioral skills, however, attunement and empathy come from deep in the medical student’s or doctor’s self. And how might the medical student or doctor communicate with this innermost self in which resides such features of effective medicine as empathy, humility, and the capacity to be moved by the suffering of others, those features of the self that transcend the boundaries between the doctor and the patient?

To be attuned to another’s pain or to summon up compassion for a stranger’s distress requires recognition of one’s own sources of pain, the ability to empty oneself so as to become a resonant vessel for another, and the willingness to feel another’s pain. These capacities begin with self-knowledge, awareness of one’s own emotions, and recognition of one’s own memories of illness and loss.

Although the best way to achieve such self-knowledge is through psychotherapy, there are less consuming methods that can help. One way to make contact with those parts of the

“I have observed that reading and writing fulfill a deep hunger present in doctors.”

doctor’s self is through reading and writing.

In teaching at Columbia, visiting other medical schools, and presenting at conferences, I have had a lot of experience reading fiction with physicians and giving them permission to write about their practices. I have observed that acts of reading and writing—for physicians at all levels of training, in many specialties, in many cities and centers—fulfill a deep hunger present in doctors. Many doctors yearn for means to express their feelings about their patients. More fundamentally, they yearn for means to connect their own lives to the deep and eternal movements of ordinary living. They yearn to convey—and hence to comprehend—all that they behold and imagine about how their fellow humans live their lives.

My reading group at Presbyterian Hospital, named “Literature at Work” by last year’s chief medical resident, meets twice a month. A few internists, a few pediatricians, a chemistry professor, an epidemiologist, the chief of gastroenterology, the hospital rabbi, administrative staff from the dean’s office, brain researchers, and occasional students and house officers spend an hour talking about stories. We take turns choosing the readings (usually stories having little to do with medicine), opening the discussion, and bringing in essays on the texts. Lately, we have been reading novels—William Faulkner’s *Light in August* and Toni Morrison’s *Beloved* are the most recent—for their scope and perfusion.

When I invite faculty from

Columbia’s English department to meet with us in discussing these novels, the professors quickly outlive their skepticism (doctors who read?) to be deeply impressed by the seriousness and sophistication we have developed as readers. We end up talking about things that we never could talk about in the hospital—race, despair, sexual longing, forgiveness, sadism, slavery—that are inaccessible to us except through fiction. Our hours nourish and exhaust us, allowing us to feel not only closer to one another but clearer about what it means to be alive.

When I act as preceptor for third-year students on their medicine rotation at Presbyterian Hospital, I ask them to keep a “parallel chart” on the patients they follow. The parallel chart is where one writes about aspects of the patient or the illness that are critical to recognize for effective care but that do not belong in the hospital chart. Having been given permission to write about patients in ordinary human language instead of in technical jargon, these students write astonishing prose about their patients’ ordeals, what they imagine the patients to be going through, their own rage at the injustice of both disease and health care, their shocking initiations to death, and the memories and emotions triggered by their care of the sick.

Instead of presenting cases and discussing pathophysiology and management three times a week in preceptor group, my students spend one of the three weekly sessions reading to one another (and to me) from their parallel charts. With such relief they realize that they are not alone in their profound feelings of sadness, helplessness, rage or pride. With such regard they learn of one another’s struggles toward both technical competence and humanistic doctoring.

Evaluating the practice of the parallel chart some time after the rotation, one student wrote, “Following writing about the patients, I usually felt at peace, as if I had greater insight into my own feelings...Seeing the situ-

ation from the patient's point of view made me feel a lot closer to the patient and I believe enabled me to feel true empathy." Writing in a parallel chart is one simple method of bringing doctors-to-be closer to their own experiences so that they can be available to the patients who suffer.

It happens more and more frequently that fourth-year students sign up to do a "Literature and Medicine" elective month with me. Most of them are writers. They bring journals that they kept throughout medical school or stories that they have scribbled on index cards kept in the short white coat's breast pocket. During that month with me they can ask, "What was that all about? Where have I been? Where did I go?"—those questions that most doctors never get to ask or answer. They work very hard during their month—reading, writing, experimenting with style, altering their forms, clarifying what it is that is within their sights.

They are often surprised at the sadness mobilized by our work. "I thought I had a good time during medical school, and yet all that comes back is the pain." I tell them that medical training involves dramatic discontinuities with self, unknown in other professional training. You are no longer a person who has not dissected a human cadaver. You are no longer a person who has not peered inside a living human body. You are no longer a person who has not inflicted pain on another. You are no longer a person who has not attended another's death.

Each of these dramatic discontinuities creates an abyss in the self, an abyss that must be bridged by memory, forgiveness and recognition. Writing about their lives—in autobiography, fiction or memoir—grants them ground upon which to stand as they mourn their old selves, reconcile with current selves, and create a future that they desire.

Conferences I run for practicing physicians convince me that effective medical care springs from engagement

"The more medicine is practiced with the whole of the human instrument, the more it can contribute to human learning."

rather than detachment. When asked to write either about patients who are hard to take care of or patients whose care felt effective, doctors spontaneously write about deep emotional experiences that mobilize profound aspects of the self. The anguish of caring for the dependent patient and the memories of one's childhood elicited by her care; the rare disclosure of aspects of the doctor's personal life that led to breakthroughs in trust for a patient; the recognition that one's over-heroic treatment of an elderly man with cancer was a proxy for the care one couldn't give one's grandfather; the initial revulsion toward a patient that becomes transformed, by means of being recognized as fear, into respect and compassion: these are the paragraphs that doctors write. These are the contents of their own books of care. They are instances, all, of permeability in the selves and the lives of doctors and patients.

We have so much to learn about the boundaries of effective medical care, and perhaps literature, among other fields, can help us understand them. We suspect that detachment from patients is achieved at least as much for our own sakes as for theirs. We observe that impermeability blocks the great and only lasting rewards of medicine, the distance perhaps protecting the doctor from pain but certainly denying the doctor the reward of understanding the meaning

of that which she beholds.

It is difficult but not impossible to test these hypotheses, to examine these dimensions of medicine, and we will do so for our sakes and our patients' sakes. We must learn with what safeguards to practice an engaged medicine responsibly.

The more medicine is practiced with the whole of the human instrument, the more it can converse with and contribute to human learning of all kinds, not as an alien arrogant knowledge (tucked away in one organ or another) but as a common gesture toward truth. The more we can examine the boundaries that keep us from patients, from meanings, and from ourselves, the more will medicine become an allegory and a model for the highest and the most sacred of life, and the more deeply it might heal. ❧

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Eyes on the Skies

by Athena Andreadis

THE FIRST BOOK THAT I CLEARLY remember reading is the unexpurgated version of Jules Verne's *20,000 Leagues Under the Sea*. Had I been superstitious, I would have taken it for an omen, since the book contains just about everything that has shaped my life and personality.

For me, the major wonder of the book was that Captain Nemo was both a scientist and an adventurer, a swash-buckler in a lab coat, a profile I imagined myself fulfilling one day. As it was, my first departure from the



The notorious ambivalence toward math and science that is supposed to descend upon teenage girls totally passed me by. Maybe that was because at the time, Greek high schools were sex-segregated, so we didn't need to worry about appearing desirable to boys by playing down our abilities; or maybe because my father, coming from a family of five boys and no girls, nurtured his daughter's spirit extravagantly—a rare attitude for a Greek man of that era.

I envisioned scientists as paladins—warrior wizards, consumed by the flame of the quest, cutting through obstacles to discover the hidden kernel regardless of personal sacrifices. Though I devoured all printed matter, my romance novels were the chronicles of scientific discoveries: Eratosthenes measuring the circumference of the earth by extrapolation, Schliemann unearthing the Mycenaean golden trove, Pasteur inventing the rabies vaccine, Kekulé dreaming the structure of benzene. There were the biographies of scientists, especially women: Maria Skłodowska-Curie studying in an unheated Paris garret and subsisting on cherries; Caroline Herschel, whose careful observations led her brother to discover Uranus, expanding the list of known planets for the first time in two thousand years.

But my deep, guilty secret, which I didn't confess even to my devoted parents, was that from the moment my English could support the habit, I had become an avid reader of science fiction. If science was my romance literature, science fiction was my hidden stash of bodice rippers.

Why all this cloak and dagger? Well, science fiction was not being written in Greece at the time and those who read it were considered to border on the socially unacceptable. The Greek language, sinuous but over-inflected, is not conducive to science fiction writing. In form, it doesn't have enough room for technical word constructions, for new or additional

genders; and in content, it carries so much mythological baggage that it can hardly find a myth that is not already in the canon.

English, on the other hand, with its percussive staccato rhythm, monosyllabic Saxon words and ambiguous word endings, is superbly fitted for the genre. And the concepts—time travel, alternative planetary physics, speculative biologies and societies—were, in my eyes at least, as valid as Einstein's gedanken experiments. In both, you started with "what if?" and followed the logical extensions of your premises. In both, entire new universes could spin off from your vision, like the Milky Way from Hera's breast.

So I arrived at Harvard, the eager novice. Overnight, I found myself in the midst of hitherto unimagined riches. I came at the crest of the science fiction new wave—LeGuin, Tiptree, Russ, Ellison, Zelazny. These writers had taken the genre out of its ghetto of thick techno-jargon and thin characters, and turned it into a force to be reckoned with, both as literature and as social commentary. Too, during my junior year, the brand-new science of molecular biology emerged from biochemistry, like Athena from the forehead of Zeus. This miracle birth made me choose my present course, a few courses shy of graduating as a physicist.

So now that I'm a scientist, with a lab of my own, how does reality compare to those edifying stories that I read as a misty-eyed adolescent? Some of the visions presented were amply fulfilled—the single-minded pursuit of knowledge, the fluttering of the heart that accompanies even the smallest discovery, the overwhelming sense of epiphany when something clicks in your brain and you know, without the shadow of a doubt, that disparate pieces of a puzzle suddenly fit. I remember, as if it were today, Alan Sokal (who is famous now but back then was a young teaching fellow in my quantum mechanics course) coming to class carrying a graph with a

Continent was to pursue adventures in science, on the wings of a scholarship to Harvard/Radcliffe in 1973. I would have liked to have taken the Nautilus, but I had to settle for a Boeing 747 instead, my first trip ever on an airplane.

All this frantic activity did not happen in a vacuum. From the moment that I could articulate my thoughts, it never occurred to me that I would become anything but a scientist. The only question was which science to choose, astrophysics or biochemistry?

clear spike from the particle accelerator. That spike announced the existence of the “gypsy” particle, the first one with the quantum property of strangeness, opening the door for the eventual discovery of quarks and gluons.

However, there were also major disappointments. The books didn’t mention the vicious departmental politics. They also glossed over the fact that academic science was (and still is) feudal, even in this supposedly egalitarian nation: lab heads literally have a death grip on the careers of the members of their labs. One lukewarm letter of recommendation and you can kiss your future as a scientist good-bye.

Still, I could take all that in stride, at least in theory. After all, I kept reminding myself, this is the real world, not Shangri-la, where everyone is both compassionate and rational. If credit and recognition often don’t go to those who deserve it—well, scientists are as fallible as other human beings, with both egos and mortgages that need feeding.

However, there was one unexpected shortcoming of science to which I couldn’t reconcile myself: for want of a better term, I call it spiritual poverty, an odd combination of scholasticism and parochialism. When I signed up to be a scientist, I assumed that the work would be the equivalent of an architect building new structures. Instead, I discovered that I was expected to be a bricklayer—essentially a data collector. The discipline demands an almost deadening concentration on analysis, at the expense of synthesis. Swashbuckling and bold strides are forbidden—or apportioned meagerly and reluctantly only to famous elderly scientists, who generally have very little buckle left to swash.

This has reached pathological proportions in the biological sciences, in which even the mildest speculation is greeted with skepticism at best, and more often with hostility. I suspect that this is essentially a sign of insecurity,

*“Creative fires need
nourishing even
when we have forced
ourselves to fit into
the straitjackets of
our disciplines.”*

ity, an attempt on the part of biologists to show those in the sciences higher up in the totem pole (physicists, for example) that they’re macho enough to be members of the club. Equally stultifying is the approved style of writing scientific results for peer-reviewed journals, which achieves the considerable feat of being simultaneously convoluted and vapid.

What makes great science is the willingness and ability to go outside narrow frameworks. Any composer who simply sits at the keyboard hitting C-sharp all day will write sterile and mediocre stuff. Ditto with science. Science is all about taking down divisions and reaching a larger understanding.

And yet, science today is all about jealously guarded divisions that have resulted in fiefdoms. People who try to reach across these boundaries are derided by their colleagues as fools or charlatans. Worse yet, these divisions have given rise to such mountains of jargon and nitpicking that laypeople can no longer easily comprehend science—hence both the reluctance to fund basic research and the ambivalence with which nonscientists regard the enterprise.

Broadly defined, science is the understanding of the physical world. However, our imagination is an integral part of that comprehension, of the ability to transform mere observations into real knowledge, instead of “least

publishable units.” Contrary to popular usage, which juxtaposes the words scientific and creative as antonyms, the best science comes from leaps of intuition. Each bridge of this kind leads to others, starting a productive feedback loop that should be appreciated and encouraged. And here is where science fiction comes in.

The quality of science fiction may vary widely, but the underlying premise is always that if you postulate something, you must follow it through—and do so at a global scale. If you envision a planet circling a double sun system, you must work out its orbit, and how the orbit affects the planet’s geology and hence its ecosystems. If you show a life form with five sexes, you must present a coherent picture of their biological and social interactions. Science fiction may give its writers latitude to extrapolate wildly, but what makes it compelling is its capacity to make connections, to find larger relationships between domains that are kept in watertight compartments in the sciences.

My personal antidote to the institutionalized tunnel vision prevailing in academic science was to write a popular science book. The rapid progress of molecular biology and its possible applications (cloning, genetic engineering) have sparked wide interest among laypeople. So I decided to visit biology in humanity’s future, and chose as a peg a TV series legendary for its longevity and its determined accessibility: “Star Trek.”

So this, my first book, gave me the opportunity to run free and unruly, to play the whole keyboard, and defy the C-sharpification of science. I felt like Rachmanninoff might have felt if he’d sat in front of his first piano after being locked in a dungeon for decades with only a cow-bell and a broken chair leg. “Star Trek” gave me ground and room to discuss concepts in disparate disciplines using the language and experience of the show as speculative fodder. In short, I finally got to write a symphony—or, more accu-



rately, given "Star Trek's" structure and form, an opera.

The kernel of this book had been in my mind for a long time. Writing it was very satisfying, because it brought all strands of my life together—my love of astrophysics, which I had a hard time relinquishing in favor of molecular biology; my synthesis of universal Western myths and archetypes. . . and, of course, Captain Nemo, my eternal role model, now (alas!) diluted into the different facets of the "Star Trek" characters.

The book let me roam through all the biological questions posed by "Star Trek," some of which are very relevant to contemporary science—if not directly, certainly as potential ethical dilemmas and stances. Starting with the possibility of life based on elements other than carbon, I examined humanoid hybrids, shape-shifters, androids and cyborgs; investigated

immortality, prostheses, suspended animation, engineered humanoids, parasitism and extrasensory perceptions; chuckled over the holodeck, the transporter and the universal translator; and finally cast a look over the societies shown in the series, as well as the ethics that guide the explorers of the Federation.

Then and now, there have been other science fiction series on television. Why choose "Star Trek"? After all, it very often mangles scientific concepts and, ever mindful of its demographic base, beats a decidedly safe middle path. Nevertheless, the series has succeeded in embedding itself in culture as no other of its species before or since.

When I first arrived in the States, the original "Star Trek" was already in syndication. In the basement of my dorm there was a battered color TV. Dorm denizens invariably quarreled

over which program to watch during all time slots—except the "Star Trek" slot. Its hour was sacrosanct.

But even more intriguing was what happened during commercial breaks. People would debate the feasibility and probability of what was portrayed in the series, like visionary scientists—or, more accurately, like visionary scientists should. This series, with all its conceptual shortcomings, with its clichés, moralizing and easy conclusions, was nevertheless nurturing the spirit and firing the imagination of future scientists and engineers. "Star Trek" served as the forum for exchange of ideas, rather than the utilitarian course lectures, geared toward maximal standardization and a B+ average for anxious premeds.

So in choosing "Star Trek" as my point of departure, not only would I use a framework shared by a large group; I would also be building on ground receptive to science. The challenge for me was to convey concepts vividly and persuasively without resorting to the opaque vocabulary of the several disciplines that I ranged across.

When word got around that I was doing a book on "Star Trek," my colleagues' reactions were interesting and revealing. Some immediately hastened to assure me that they had never polluted their mind by watching the series. Others told me in ominous tones that, once the book was out, I would be categorized as a "science popularizer" and my reputation as a serious scientist would suffer irreparable damage (which would put me in the company of people such as Carl Sagan, Stephen Jay Gould and Stephen Hawking—a punishment that I can handle).

These reactions brought home to me how conditioned today's scientists are to remain within narrowly defined boundaries. And yet, they would stand to benefit enormously from presenting their work in accessible form: how else are non-scientists to appreciate and judge the scientists' efforts? And how

else are the sciences to attract the next generation of apprentices? Sagan's "Cosmos" series, derided as it was for its "billyuns and billyuns" refrain, did more for scientific recognition and prestige than the NIH reports to Congress for the last few decades.

The most amusing and touching thing was that several of my peers, including some of those who disavowed knowledge of "Star Trek" or issued the dire warnings, would come furtively to discuss scientific aspects of the series—as enthusiastically and hungrily as the denizens of my undergrad dorm. Creative fires need nourishing even when we have forced ourselves to fit into the straitjackets of our disciplines, and "Star Trek" is as good a fuel as any.

Without a doubt, science is a cumulative, collective enterprise, like the building of the great cathedrals. It is also true that riches and fame figure in scientists' equations, as well as the desire to do something for the greater good. However, the deepest, most fundamental reason that makes people willing to become scientists, to put endless amounts of energy and time into the effort at the expense of their health and relationships, is the license to dream, the hope of making a novel connection, no matter how small—of experiencing those moments of epiphany that make it all worthwhile.

The wish to experience moments of extraordinary comprehension is not confined to intellectual elites, but is recognized as a universal human prerogative—and not that high in the hierarchy of needs, either. When the textile workers rose up in protest and organized the historic strike of 1912 in Lawrence, Massachusetts, they demanded "bread and roses." They recognized that the right to dream was as vital as having food and shelter. The spirit can be starved just as easily as the body.

So now here we are, in the technologically advanced Western civilization of the late twentieth century, with our obsession with tangibles and our stran-

glehold on imagination. Can we live only day to day, without a large future goal? Now that humanity has covered the face of the planet, where is the frontier? What will give us a unified vision, something larger than ourselves?

In the past, people built great temples, sent out expeditions into the unknown or experimented with novel social systems. Why else did people throng to see the transmissions of the Vikings and Voyagers? Now we're confined to protecting what is, rather than imagining what will be.

Unless we have collective goals, we are doomed to the relatively sterile enterprise of "bettering ourselves" at the individual level—watching our navels among dwindling prospects and resources. Quest for knowledge in general, but particularly the desire for space exploration so extolled in "Star Trek," is the large goal, the last goal, if only because it guarantees our long-term survival. The Earth is beautiful, but it won't live forever even if we husband its finite resources with infinite care. Eventually, our sun will exhaust its fuel, turn into a red giant and engulf the inner planets.

When that happens, we'd better be able to take to the stars, whose fiery engines created the elements that compose our bodies. From the stars we came, and to the stars we must return. And though science will build the starships, it's science fiction that will make us want to board them. ❧

Athena Andreadis, PhD, is HMS assistant professor in neurology at Mass. General Hospital and assistant scientist at the Eunice Kennedy Shriver Center. Her fantasy and science fiction stories have appeared in After Hours, and she is a regular book critic of the Harvard Review. Her first book, To Seek Out New Life: The Biology of Star Trek, will appear in the spring of 1998.

Focused on a Goal

"Everyone here is focused and goal-oriented, so it's not like I'm different," explains second-year HMS student Mark Adickes. Maybe all HMS students are focused, but not everyone has played football for over 20 years, 10 of those years in the National Football League.

After a highly successful career as an offensive lineman—a career that culminated in winning the Super Bowl in 1992 as a member of the Washington Redskins—Adickes has embarked on a second career as a doctor. Adickes began to think seriously about a transition from football at age 30 when after seven years he was no longer in the starting lineup. "I had one foot in and one foot out of the NFL during my last three seasons."

But Adickes, who is 36, says few players think beyond their playing days, especially with the kind of money that professional players are now offered. "It's a difficult transition to go from being treated special and believing it, to it all being over." Adickes attributes his ability to not take himself too seriously to his position on the field ("Offensive linemen always get blamed for problems and never get praised,") and to his parents, who taught him that "everybody is exactly the same."

Adickes became interested in health care midway into his playing career when he tore three ligaments in his right knee. "At first I was interested in personal training and then I started to lean toward physical therapy." It was his wife, Jackie, whom he met during his last season playing football, who brought up the idea of medical school by asking him, "Why work for a doctor when you can be a doctor?"

With that kind of support behind him, Adickes spent two years taking science courses at George Mason University in northern Virginia to prepare for medical

school. He had studied business as an undergraduate at Baylor University. Although always confident about his physical abilities, Adickes felt tentative about how he would fit into the academic climate. In fact he has felt very comfortable at HMS right from the beginning. "I'm so happy to be here. There's a lot of camaraderie, everyone helping each other."

Adickes is modest about his presence at HMS, but his affability and charisma are obvious. "There's usually a crowd around Mark," says Janet Lipponen, program administrator for the Holmes Society.

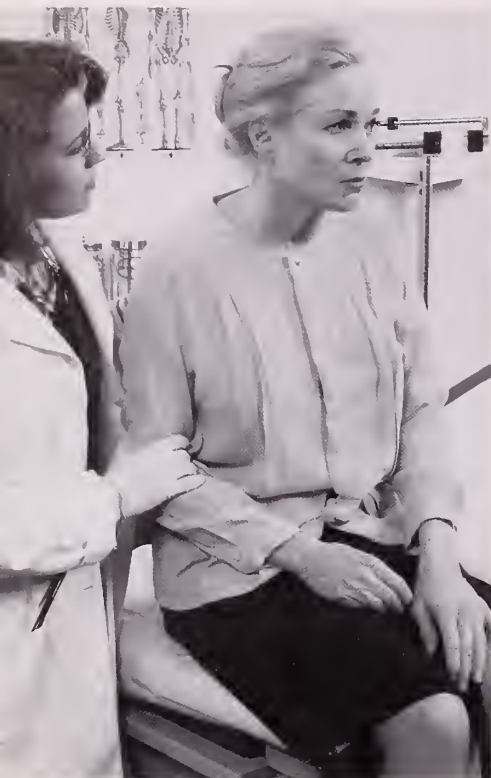
The more difficult transition, says Adickes, has been the change from single life to marriage and having children soon after—"doing more than one thing at once." Like other students who are also parents, Adickes is organized and carefully structures his schedule so he is home for dinner and bedtime with his three children.

Admittedly between school and home life there's not much time for watching sports these days. When he does watch football, Adickes is pulled in two different directions. "I consider myself a fan, but I was a player for 10 years so I know the workings of the system and understand the injuries. I watch the offensive-linemen in the trenches." Adickes still stretches and does sit-ups daily to prevent back pain.

Although as a child Adickes wanted to be a quarterback, he chose to be an offensive lineman because he knew he'd excel at that position. He says he'll apply that same logic to his medical career. At this point Adickes is leaning toward orthopedic surgery, acknowledging that it's a competitive field. Judging from his first career, Adickes should be able to handle the competition just fine.

Janet Walzer





Having It All

by Nancy Bowen Kaltreider

MY MOTIVATION TO EXAMINE THE unique issues faced by women learning to balance career and family began in 1960 when I got an acceptance letter from Tufts Medical School that began "Dear Mr." (more discouraging because I had been interviewed!), and later when I faced the HMS gauntlet of male eyes at breakfast each morning in Vanderbilt Hall. I knew that I wanted both a career in medicine and a family life and longed for role models and guidance about how to accomplish that. Over the years, I struggled to find my path in the shifting terrain and came to enjoy a rich if overly full life; it seemed natural to gather groups of women to talk about these issues. First, it was support groups for women residents, then an umbrella Program for Women in my Department of Psychiatry at UCSF, then a symposium on "Developmental Issues for Professional Women," and finally editing a book put together by a group of women professionals, *Dilemmas of a Double Life: Women Balancing Careers and Relationships* (Jason Aronson, 1997).

The book is written to be a paper mentor, accessible to all women for whom job is "career"—an essential ingredient that takes up space in all waking life, much as relationships are

emotionally tracked throughout the work day. It is a book advocating informed choice across the life cycle and suggesting how to find meaning and pleasure in the combination of career and family—at least in the saner moments. This piece is a condensation of a chapter salient to many HMS relationships, "Love in the Trenches: Dual-Career Relationships," co-authored by me, Carolyn Gracie, MD and Carole Sirulnick, PhD.

Think about how rapid the generational change has been. My mother resigned from her job two weeks before her wedding and never returned to work until her youngest entered college. I married my anatomy lab partner after the first year of medical school. A faculty member in obstetrics said, "Well you got what you came for so now you can leave." I didn't and two children and 36 years of marriage later I have some thoughts about the issues for dual-career relationships.

Such relationships represent a profound social experiment, carried out behind closed doors and without role models for guidance. The primary love relationship is the stage upon which the work and family interface is played out. Increased flexibility in the workplace is an essential component of this



brave new world; however, for the sake of brevity, I will focus only on couples' themes.

As Theodore Nadelson and Leon Eisenberg have described in their 1977 paper about being married to successful professional women, dual-career relationships at their best can provide a rich and meaningful life experience as each partner becomes for the other an intellectual companion, best friend and lover. Because there are few role models of older couples who placed high individual value on both work and family commitment, the care and maintenance of these relationships often involve more stress than either partner anticipates. Traditional gender role expectations no longer apply, yet they lurk close to consciousness, shaping our sense of what we "should" bring to the interaction with our partner.

Arlie Hochschild has noted that tensions increase as women physicians embark in directions far different from the life journeys of their mothers or grandmothers, alongside men who have changed less radically, and sometimes, less willingly. Many dual-career partnerships are not formalized by marriage and many families are not based on a heterosexual model, yet I hope that most of the themes will

apply to their lives as well; I also acknowledge the additional stress imposed by these non-traditional choices.

These are common dilemmas and the evolving solutions are far from resolution as a new generation, seeing their parents reeling from "having it all," now works on a more flexible model to contain the inevitable work-family tension. In research by C. Wortman and colleagues, when women and their husbands were asked how often they had experienced conflicts between their work and family responsibilities in the past month, over 75 percent reported experiencing such conflicts "every day." The conflicts include time management, "overload" symptoms interfering with performance and the difference in a partner's expectations of behavior at home and work.

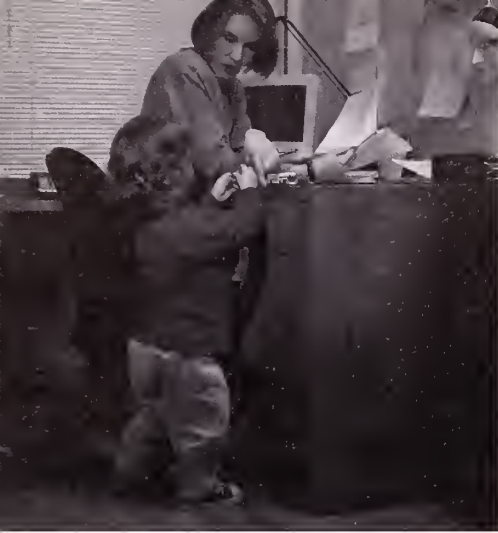
The dual-career lifestyle is demanding but challenge can facilitate growth; the costs may be balanced by considerable benefits, including personal fulfillment and increased income. The sense of self is enriched by multiple sources of identity and shared incomes that allow each partner to make individual career choices less driven by financial necessity. Although challenging, work-family conflicts are

not necessarily any more stressful for women than the traditional limited roles but simply require new skills to maximize the rewards.

LESSONS FROM THEORY

From a theoretical standpoint, a key concept in the dual-career relationship is what Walster and colleagues' term equity: two individuals are receiving fair but shifting gains based on the overall balance of rewards and costs in the relationship. This is contrasted with an egalitarian relationship where the focus is on equal and often carefully measured distribution of the various roles, responsibilities and obligations.

As women increasingly have education and career prestige equal to that of their partners, there is often a shift towards more supportive behavior in both directions. Each encourages the other to talk about work-related problems, to take advantage of professional opportunities, and to support the partner's occasional extra time in the workplace by pitching in on extra household chores in a time of work crunch. A more complex psychological issue is the appraisal of equity: in several studies, married women professionals tended to overvalue the amount the husband "helped" at home and to



apply harsher standards to their own performance in the marital and parental roles than to that of their husbands. A 1993 survey by the Family and Work Institute reports that working women still do 87 percent of the shopping, 81 percent of the cooking, 78 percent of the cleaning and 63 percent of the bill paying. Men tend to contribute more to the family income and thus perceive their lower level of domestic work as fair.

The rewards of a dual-career relationship are substantial but so are the sacrifices. The man gives up the power of the sole breadwinner role but gets to be closer to the kids. The woman gives up the protection of husband's financial support but she gains personal autonomy instead of her mother's dependency, and the freedom to pursue work she loves. What's exciting about what J.S. Wallerstein and S. Blakeslee term the "companionate marriage" is that everything represents a choice. There are no foregone conclusions and everything must be negotiated.

LESSONS FROM LIFE

Joan, age 39, is an ophthalmologist in a partnership. She commands a salary well over \$200,000 a year. Her job entails 50 hours plus a week as well as many professional dinners, breakfast meetings and some travel for consultations.

Her husband, Brian, age 41, is a family practitioner working 40 hours a

week in an HMO near their home. He grosses between \$100,000 to \$120,000 a year and has some flexibility to coach soccer and baseball teams after school. He attends one major professional meeting a year for one week.

The children are Sam, age 8, and Becky, age 4. Becky is in a daycare/preschool program from 8:30 AM until 5:30 PM. Sam goes to classes and an aftercare daycare program at his elementary school.

A typical weekday schedule is Brian taking the kids to school in the morning and Joan driving to work in the city. Brian picks up the kids and takes them home. Joan arrives home at 6:30 to 7:00 PM, fixes dinner, and while Brian does the dishes, she gets the kids bathed. They both put the kids to sleep and then either watch TV, make phone calls, talk a bit, read journals, do the laundry, pay bills or simply go to sleep. Although they could afford household help, they value privacy and only use a weekly cleaning service.

On the weekend, the first priority is kid-focused activities that both Joan and Brian try to participate in fully, e.g., soccer/baseball games, birthday parties, play dates, visits to the park or pool, family outings. Joan will typically do the laundry, which Brian helps to fold, and do a major grocery shopping, which Brian puts away. During the week, Brian or Joan will often stop and pick up some needed groceries at the local market. Evenings are generally spent at home on weekends with occasional spontaneous dinners with other families with young children. A few times a year, Joan and Brian will hire a babysitter and go out for special occasions.

Each feels that the quality of their marriage is eroding and they jointly decide to enter couple's therapy. Joan has the following concerns and complaints:

- constant pressure from work
- feels that she handles too many of the family chores
- no time for herself
- jealous that Brian gets time with

the kids in the afternoon if he is able to get away from clinic early

- feels she is too much of a "mother" and not enough of a "woman."

Brian protests about the following:

- does not feel appreciated for what he does
- has no time to play tennis with friends
- wants to plan a weekend away with Joan but feels she is uninterested in spending time alone with him
- their sex life is practically dead because they are always tired
- Joan does not take his financial suggestions seriously
- he secretly worries that he is drinking too much.

The Joan/Brian story is not the stuff of novels or even sitcoms. They are looking for help to bring meaning back to their relationship rather than justification for leaving it. Neither is carrying on a clandestine affair: how would they find the time? Yet contained within their description are many of the patterns of miscommunication, clash of values and burn-out that haunt dual-career marriages.

COMMON PROBLEMS

Developmental Asynchrony

Perhaps one of the most synchronistic days in a couple's life is the day of their marriage. Presumably on that day, each person is primarily focused on the other, the marriage and shared priorities. However, after that day, each individual in the couple ebbs and flows in and out of sync with the other person. Joan is jealous of Brian's more flexible access to the children and Brian resents her more absorbing and prestigious career path. Most couples do not do a lot of conscious decision-making on prioritizing and coordinating their career paths.

Fatigue

More than ten years ago, Carolyn Gracie and I did an interview study of both partners in dual-doctor relationships in the San Francisco Bay Area.

We found that women more often than their male partners complained of emotional depletion, fatigue and guilt, especially when it came to their own assessment of their mothering or other nurturing roles. The sick or frightened child still usually called out for "mommy" and there was no way to not respond. Men physicians in the study did not consider as consistently the effect of their working hours and habits on their wives and children and did not generally experience the need to modify their own career plans to support family needs.

Time

Time is of the essence in a dual-career relationship and much of the communication is about the endless managerial planning needed for tasks and events. Joan and Brian had effectively figured out how to get food on the table, the clothes cleaned and the car serviced. What was lost was the companionship of the early relationship as they now became like two ships that pass in the night. Others describe the "relay race marriage" where the kids are efficiently handed off from one partner to the other but the runners can never stop to connect. But blocks of time do not magically appear, one's professional obligations are never really finished, and both partners in a good marriage long for the sense of validation and connection that they dimly remember from the past.

Intimacy and Sexuality

Thomas and colleagues found that the glue in good dual-career marriages is often sexual satisfaction, perhaps achieved by scheduling intimate moments with as much priority as other competing events. When this priority is not set, the loss of sexual drive may be as simple as time and fatigue but, on another level, it may have much to do with individual feelings of anger, loneliness and a perceived lack of volunteered intimacy by the other. As with Brian and Joan, if the relationship is shaky, there may be underground resistance to scheduling

time to be close due to the fear of confronting that they are falling out of love.



Children

A crucial factor in predicting marital quality is the husband's assistance with child-rearing. Husbands are more likely to participate in the fun aspects of childcare (like Brian coaching the soccer team) and less likely to volunteer for the more burdensome tasks, such as getting up in the middle of the night or staying home when the child is sick. Wives often seem reluctant to confront these issues and rather try to subtly manipulate their spouses into participating in childcare. For example, one mother described how she would try to ignore her two-year-old son's urgent requests for "more juice" several times, hoping that the repetition would catch her husband's attention.

When dual-career couples share ambition and pleasure in each other's company, it is understandable why the decision is increasingly made not to include children in the package. Now having children is a choice, and couples on the fast track may find it less

attractive than previous generations or else opt to have a single child who can be fit into their adult world.

Eldercare

With the aging of the Baby-Boomer generation, eldercare is becoming an increasingly important factor in the lives and time commitments of midlife adults, particularly the time-deprived dual-career couples. Often the aging parents' needs escalate before the tasks of dealing with one's children have been phased down and this clash is painful. Even when the children have left the nest, the frequent postponement of personal retirement savings goals to meet children's educational expenses makes the dual-career couple then reluctant to take on financial responsibility for aging parents or to give up time now allocated to work commitments that they have waited so long to fully savor.

Competition

It is unlikely that women who are increasingly welcomed into the workplace as full partners will not bring home that expectation of equal treatment, including a newfound pleasure at being successful and powerful. Over

and over studies have shown that the greater the salience of the woman's work role and the more obvious her prestige, the more at risk is the marital relationship. Brian's sense of not being appreciated or taken seriously by Joan is at least partially a reflection of his being threatened by her more intensive and remunerative professional role.

In a social setting, the man with a powerful wife is often met with quizzical looks and comments such as "she must be a handful." The derogatory intensity of the term "pussy-whipped" makes it clear that this discomfort with competition in a marital relationship is a societal prejudice and not just a personal conflict.

Professional Stress

E. Gardner and R. Hall found that many people with a professional job commitment complain about a syndrome of chronic fatigue, anger and cynicism that floods their relationship. In our dual-doctor study, respondents described themselves as being tired either "usually" or "always." One female physician noted "most of my concerns about my professional competence are neurotic, and I realize that my anger at the training system has nothing to do with my husband." She recognized through psychotherapy that her frequent perception of her husband as unsupportive was really about her male-oriented work environment and that her own needs for control often led to blocking her husband's frequent attempts to be helpful.

Several physicians in our study were in their second marriages and ruefully noted that in retrospect they could see how much their own professional stress symptoms exacerbated the problems in their first marriages. In the case example, both Brian and Joan may be confusing work and family stressors and attributing too much of their dissatisfaction to relationship issues.

Gender Norms

In this time of societal reorganization of long-held value systems, most couples have not talked about the profound impact of gender role expectations on their own conceptualizations. Recall that Joan was vaguely uneasy about whether she was "enough of a woman" and that Brian was hurt that his male expertise in finance was not taken seriously enough. The issues leak out in unanticipated ways: a woman's sense of panic when she signs their first mortgage and realizes that her salary is crucial to the contract and not just "play money"; a husband's assumption that his wife will be the social planner for all the special occasions of their extended family, or even the shared expectation that the husband will "know" how to parent and do domestic chores intuitively, although he has had no adequate parental role model.

COPING STRATEGIES

There is no tradition or societal support mechanism in place for dual-career marriages. Both partners need substantial respect for the other and must affirm the importance of career achievement for each of them. Moving from being a couple to a family should be a choice made with eyes wide open and the changing responsibilities discussed ahead of time. Communication between partners about career development, family coordination and the maintenance of intimacy is essential.

Some basic guidelines include: all criticism should be constructive, think before you speak, ask for time out if you feel flooded with emotion until you figure out what is going on, watch for the "window of opportunity" for change. Time spent on communication initially in the relationship will be time saved later on.

Set aside, even schedule, time for adult interaction—sex, fun and relaxation. Consider yourselves as social revolutionaries and talk together about your shifts in gender roles and what choices still make you feel guilty.

Acknowledge that the task distribution will never seem quite equal but figure out how to make it seem more equitable. Discuss values openly, describing the differences between how you feel and how you think you should feel. Think about what models you carry from your parents' marriage, both positive and negative. Plan regular evenings out alone with each other and an occasional weekend away. Even though you feel that you hardly see the kids, your intimacy is a good investment for them as well. When the nest is finally empty, you don't want to face a stranger across the table.

Most dual-career parents put aside personal interests and hobbies because that appears to be the area of most flex in the system. The inevitable query on the high school reunion questionnaire about "How do you spend your leisure time?" usually evokes guffaws from working parents followed by answers such as "pay the bills" or "fall asleep."

Yet each member of the couple should make a significant effort to maintain his or her own physical and emotional health. Taking care of the self is ultimately taking care of the marriage because it is impossible to be supportive unless you are feeling whole.

It is important that women professionals do not feel alone and have an opportunity to talk with others in similar circumstances. Several of the book authors have been part of a dinner group of women psychiatrists that has met monthly for more than ten years. Together the group has moved through discussions of infertility, pregnancy, starting a practice, building a university career, coping with parental death, setting limits for adolescents and the first hot flashes.

In the discussion groups that were the center of the symposium that generated this book, the sections on dual-career relationships were packed. The topics brought up for discussion were far ranging and it soon became clear that there were no obvious solutions and that no one was doing it perfectly:

that knowledge alone somehow seemed therapeutic. The women encouraged each other to let go of the need to be superwoman, to accept a more modest level of cleanliness as civilized, and to identify what tasks could better be done by hiring others. They talked about how to maintain flexibility, self-esteem and intimacy without waiting for the world to change first.

The older women in the groups suggested that not all things are possible or even necessary and urged investment in the couple relationship as paying the best long term dividends. Being in a good marriage in which the capacity to love and to work is valued by both can be transformative. After the academic accolades are forgotten and the promotion to partnership is remembered as a mixed blessing, it is the loving connection to each other and the next generation that will give life meaning.

IS IT WORTH IT?

This book is written by women who love their careers and their relationships. We are proud of using our intellect and skills in leadership roles that were rarely open to our mothers' generation. We delight in coming in from the outside to sit in the halls of power and speak in our own voices. We love our connections with family and feel that nurturing the next generation, by mothering and mentoring, is at the core of life's meaning. We rarely feel bored or empty because *The New England Journal of Medicine* and *Gourmet* equally stimulate our creativity.

Yet we are also women who feel drained, frustrated and guilty much of the time. Filling a complex array of roles, we feel that we have never reached our full potential in any arena. No matter how shared the domestic tasks, we still track the family agenda in our heads while attending grand rounds and cringe when our kids ask why we don't serve hot dogs at school like the other mothers. We have cho-



sen partners who are stimulating and supportive but we are often so tired by evening that our interaction is cursory. We feel blocked on our career paths by not knowing the rules of play or, worse yet, discover that the payoff of power and prestige that goes to the winner is not as intoxicating as anticipated.

Potentially, we are all of these women and that is the dilemma.

Coping strategies are as various as the women themselves. However, the three-generational span of authors helped us understand the importance of a developmental perspective, realizing that choices and paths taken could be reworked many times in the course of a lifetime. Understanding the psychosocial aspects of feminine development was of help in honoring our uniqueness rather than struggling to "do it like a man." There were many part time and creative alternatives to overly full lives, and sequencing of priorities seemed to be the key.

A few principles did emerge: do what you love. Before making choices, think about the enduring sources of satisfaction in your life. Then, work as hard as you can to gain the skill set needed to achieve your dream. Prioritize and sequence choices and hope that you don't die young.

Nurture each other and also yourself. When you have climbed up the ladder, reach back to those below you.

Finding "the path with heart" can lead to an enduring sense of satisfaction based on meaning in both career and relationship. Multiple sources of self esteem can buffer the fluctuations in any one area. It is crucial that the gains of feminism not just be translated into a new and more elaborate trap of impossible lives. Honoring both the self and relationships is essential. Each generation will add new pieces to the puzzle but already the pattern of issues for women choosing career and relationships is beginning to emerge. ✨

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My Life as a Dog, MD, PhD

by Lewis A. Chodos

30 June 1989: Well, here I am about to start internship. The MD-PhD program is behind me now, and my graduate school thesis, "Mating strategies among South American pinworms," is bound and sitting on the shelf, secure as a landmark in the field. Had orientation today. I seem to be one of the oldest interns, at least as far as joint pains and male pattern baldness goes. The head of the internal medicine residency program said we would be indispensable to the hospital. Mother called to wish me luck and wanted me to explain one more time what it was I had been working on in graduate school for the past six years. I explained to her how indispensable I would be to the hospital as an intern. She asked why if I was so indispensable was I only making four dollars an hour? Oh well, I'm a real doctor at last. Dr. Jack Dunbal—what a rush. Can't wait to get my own beeper.

8 July 1989: Can't wait to smash my beeper with a hammer. Internship has been rocky. I have yet to get to bed on a call night. I can't remember anything from medical school. I nearly mutilated my last patient trying to start an IV. Maybe I made a mistake leaving the lab. Called my thesis advisor today. He asked me again why I was wasting my time in the hospital. Said I still had a bright future in pinworms if I came to my senses quickly. He suggested I apply now to laboratories for postdoctoral positions while my curriculum vitae still has a publication on it from this decade.

12 July 1989: Got paged by the head of the residency program today. He told me I needed to decide if I wanted to short-track through residency or if I wanted to do the full three years. I've been an intern for a week and a half. I haven't found my locker or the radiology film library, and I still can't figure out how to set my beeper to the "vibrate only" mode. Don't know if I'll even live through three years of residency.

2 August 1989: Got paged again by the head of the residency program. Asked if I had made up my mind about short-tracking. I told him after being a doctor for only 32 days I wasn't quite sure whether I would need to do two or three years of residency to become a competent clinician. He said he sympathized and mentioned that I should be choosing a subspecialty since fellowship application deadlines are just around the corner. Didn't have the heart to tell him I wasn't sure I still wanted to be a physician, much less one with a subspecialty. At the moment I can't see much further into my future than the ten o'clock meal.

18 August 1989: Things are getting worse. I haven't paid bills since internship began. I can't even find the floor in my apartment. There's something growing in the kitchen sink. I fell asleep (again) while my girlfriend Julie was trying to talk to me about "our future." According to the schedule, my next day off is in October. Why did I leave the lab?

27 August 1989: Today I decided what I want to do with my life. Eat, sleep and shut off my beeper. Is there funding available for that? Alternatively I could train until I'm 65, then retire. Tough call.

4 September 1989: Mom called again today—wants to know when I'm going to get a real job. Julie wants to know where our relationship is going. The chief of medicine wants to know what fellowship I've decided on. Still haven't figured out what lab to go to. Despair.

25 September 1989: Spent ten minutes leafing through last month's issues of *Nature*. Is it just me, or have the titles of the articles gotten more complicated since I left the lab? And what's all the fuss about the "polymerase chain reaction?" Probably just another fad, like those kits they sell containing tubes of water. Who's the rocket scientist who came up with that idea?

29 September 1989: Still have no idea what subspecialty I should go into, or if I should go into one at all. It's hard to imagine myself as a rheumatologist or endocrinologist when I have difficulty spelling the words.

6 October 1989: Had my first day off since August. Spent the first half trying to remember where I parked my car. Spent the second half throwing darts at a moldy orange on the fireplace mantle (the only thing Julie left when she dumped me). Really should decide what to do with my life. Giving some thought to becoming the poster child for Ambivalence.

17 October 1989: Had a meeting today with Dr. Borland over at the university about doing a postdoctoral fellowship in his lab. He seemed enthusiastic and said he had an opening in six months. I explained I just wanted to get internship, residency and a clinical fellowship out of the way first, and so I would want to start in about three years. Long silence. Told me he didn't understand why I was wasting my time in the hospital.

30 October 1989: Had my rheumatology fellowship interview today. Told Dr. Hill I still wasn't all that sure what a rheumatologist did, or if I really wanted to be one. Told him how happy I was to be going to Dr. Borland's lab to do research after my clinical fellowship year. Dr. Hill apparently wasn't so happy that I would be going outside the rheumatology division to do my research. Said he might be able to support my application if I worked in a lab in the rheumatology division: his (for example). Looks like rheumatology is off the list.

13 November 1989: Had my endocrine fellowship interview today. Told Dr. Frockstein I've always wanted to be an endocrinologist, ever since I decided to do a clinical fellowship three weeks ago. She asked me where I saw myself ten years down the road. I asked her if this was the same road I'd been asked to see myself down for the past 30 years during interviews for college, medical school, graduate school, and residency, and if so did she have any idea why it was so poorly signed? Looks like endocrine is off the list.

29 November 1989: Hematology fellowship interview today. Told Dr. Rotford I've always wanted to be a hematologist, ever since internship began five months ago. He asked if my ultimate intention was to run a laboratory at a major academic institution or to pursue private practice in hematology. I said I'd been thinking more along the lines of wheeling a shopping cart around the local airport parking lot and taking large doses of thorazine, though I did not consider this incompatible with making a meaningful contribution to the department. Looks like heme is off the list.

18 December 1989: Ran into my thesis advisor in the emergency room last night (crescendo pinworm infestation). Told me a recent paper has revolutionized the pinworm mating field and rendered my six years of work in the field obsolete. Maybe no one will read the paper. At least my postdoc is already lined up.

26 December 1989: GI fellowship interview today. Told Dr. Simpson I've always wanted to be a gastroenterologist. Always. Why else would I have spent six years working on pinworms? Hopefully he won't find out that I failed my GI pathophysiology final in medical school because I thought duodenal ulcers were caused by bacteria. He wanted to know what I saw myself doing after my internship, residency, clinical fellowship and postdoctoral research fellowship. I told him I saw myself running a basic science laboratory, maintaining a thriving clinical practice, teaching on the GI consult service two months a year, and successfully competing for large NIH grants—significant portions of which I imagined turning over to the GI Unit. Looks like I'm going to be a gastroenterologist.

31 December 1989: Well here it is, New Year's Eve. I still have yet to work in the EW, the ICU or on the oncology service. I've lost my girlfriend and created a new life form in the kitchen. On the brighter side, I've finalized short-tracking plans, been accepted for a clinical fellowship, and have set up my postdoctoral research training. I've spent the first six months of internship planning the next six years of my life. Thank God it's over. All I have to do now is learn how to be a physician. If I could just remember where I parked my car. Happy New Year.

24 June 1992: Hard to believe this is the last week of my clinical fellowship. What a thrill to finally check off those previously empty boxes on my life plan marked: "Internship," "Residency" and "GI fellowship." It only took three years. Bargain. After this, it's a week of vacation, then off to Roger Borland's laboratory for my postdoctoral fellowship. The GI secretary reminded me that he will need my beeper back so that he can give it to one of the new fellows on July 1. Panic. How can I give up my beeper? I'm nothing without my beeper. #1450. It's who I am. He might just as well have asked me to take off all my clothes and dance naked in front of the Board of Trustees (again).

30 June 1992: It's over. Clinical training is over. I'm actually sad. Convinced the GI secretary to let me keep my beeper (after a brief tug-of-war) since I'll be keeping my GI outpatient clinic. These last three years in the hospital have been great. I feel like I own this place. I can manage the sickest patients in the hospital—there's nothing that can come out of an ambulance that I can't handle. I know the GI literature inside out—can wow the residents with my consult notes

and give impromptu lectures on a hundred different topics. I know all the attendings—the gomes and the gods. I know every nook and cranny of this hospital—every elevator, every short cut, every back stairwell. I know the magic words to get any test in the hospital done stat. I even know where the nurses hide the cookies on White 8. Yes sir, I have achieved peak efficiency. I know everything and everyone. I am sitting on top of the world. On to the Borland lab!

7 July 1992: Where are the pens?

8 July 1992: Where's the tape?

9 July 1992: Where are the pipette tips?

10 July 1992: Met with Roger today. He gave me a brief rundown on the 42 projects being pursued by the other 21 members of the lab. I didn't recognize any of the names of the molecules. Just kept nodding my head. At least he didn't ask me where I see myself ten years down the road. How long can I keep up this charade?

21 July 1992: Roger asked if I'd made up my mind about what project I was going to work on. He reminded me that I would have to give a talk in nine months on my experimental progress. I laughed confidently and told him if I didn't have enough data to talk about after nine months I would really be in trouble. Why he didn't he smile?

26 July 1992: I think I've hit on THE project. All the pieces are falling into place. I'll run it by Cindy (the postdoc with whom I share my lab bench) tomorrow before I talk to Roger about it.

27 July 1992: Cindy tells me the project I am proposing was published three years ago. Spent the day trying to think up a new project but I kept getting paged by clinic patients (four times). Is it true that I actually asked to keep my beeper? Was my head spinning around at the time?

1 August 1992: Roger says I really need to decide what project I'm going to work on. I told him I had narrowed it down to two topics and that I would talk to him about them next week. When he asked me what the two topics were (drat him) I looked down at my beeper as if it were vibrating, cursed, sprinted down the hall and ducked out a back stairwell. Good thing I didn't go into endocrine—he never would have believed I was getting stat-paged for a hirsutism consult. What am I going to tell him next week? Panic.

12 August 1992: Met again with Roger. Told him I want to work on molecular mechanisms of crescendo pinworm infestation. Explained how little was known about the molecular mechanisms of pinworm infestation. I hate it when he stares.

13 August 1992: O.K. Pinworms. I can do this. This is something I actually know something about. If only I could explain it to my mother.





6 October 1992: Had clinic today. Took me an hour to make it across town through traffic. What are all those people doing on the road at lunchtime? Realized I haven't driven outside in daylight for several years. Went to look at a KUB on one of my clinic patients. There's a wall where the radiology library used to be. Had a meeting with Dr. Simpson (GI division chief) to update him on my progress in the lab and on my decision to work on pinworms. He nodded meaningfully and said "The flower of gastroenterology," which I assume is good. Told me there would always be a position for me in the division.

2 November 1992: Every time I talk with someone about the long-term plans for my project, they say "Can't you do that by PCR in about a day?" It's beginning to get concerning. I'm too embarrassed to ask if the PCR machine is that big square thing over in the corner.

18 November 1992: Nothing is working in the lab and I've got no life outside of the lab. Fell asleep last night while Kathryn was trying to talk to me about "our future." Unfortunately, we were at a restaurant at the time and my head fell into my soup. Mom called—wants to know what I'm working on and if it's related to what I did as a graduate student. Only five months left until I have to give a talk on my experimental progress. I'm never going to make it.

14 December 1992: Nothing is working in lab—except my beeper, which seems to go off about every 30 minutes.

16 December 1992: Left early to have dinner with Kathryn last night. She wants to know where our relationship is going. Said she thought things were going to get better after I finished my clinical training. I could swear her hair is a different color since the last time I saw her. If only I could find a woman who understood how much pinworms mean to me.

22 December 1992: Had clinic today. Found out that Simpson is gone and there's a new GI division chief. Seems Simpson had a psychotic break several months ago. Apparently "the flower of gastroenterology" was the only thing he said to anybody. Went to visit Mr. Savitsky (my clinic patient whose peptic ulcers I've been treating faithfully with H₂ blockers for the past year) who was admitted to the hospital over the weekend with an upper GI bleed. Yelled at the resident for starting him on three (yes, three) antibiotics. She informed me that ulcers are an infectious disease—*Helicobacter* something-or-other. ("Don't I read the *New England Journal*?") I've only been out of training for six months and I'm already a gome-doc. On a brighter note, perhaps I could get credit for my answer on that pathophysiology final.

31 January 1993: Made it out of the lab last night to get something to eat. Ran into Kathryn and her new boyfriend who asked what I did for a living, looked at Kathryn and laughed. Would have pounded him if I had been able to make it to the gym in the past four years.

16 February 1993: Nothing is working in lab. I can't even grow pinworms. Met with the new GI division chief over at the hospital. Told him all about my pinworm project. He asked me where I see myself ten years down the road. Not sure how to interpret: "Have you considered leaving Boston?" Maybe he'll have a psychotic break.

5 May 1993: Thought I had an exciting result this morning when I developed my film. Knelt down in front of the film developer practically sobbing with joy, then realized I was looking at the film upside down. I'm never going to get a job.

30 June 1993: Got paged by one of the GI fellows who is finishing up her clinical year and had just had an argument with the GI secretary about keeping her beeper. She wanted to know if I would be willing to give her mine. Things are looking up.

10 October 1993: Can it be? Have my prayers been answered? I actually did an experiment yesterday that worked. Naturally, I didn't believe it at first—figured it was either a cruel joke that Cindy was playing on me, or a Herculean effort on the part of my therapist to keep me from throwing myself off of Building A. Okay. The experiment wasn't much—a restriction digest actually. But it had controls. And there were no kits involved. Perhaps my professional life hasn't completely disappeared into the abyss after all. Who knows? If I can string a couple of these meager victories together, maybe my genetic screen for molecules involved in pinworm infestation will finally bear fruit. If only I could explain it to my mother.

30 June 1995: Well, here I am about to start my first faculty position. Finally, no more idiots asking me where I see myself ten years down the road. Medical school, graduate school, internship, residency, a fellowship in gastroenterology and a postdoctoral fellowship in cell biology—all behind me now. Yes sir, 14 years of my life, vanished. I'm so excited I can hardly sleep.

1 July 1995: What a rush. Jack Dunbal, assistant professor of medicine. Has quite a ring to it. Got a lab with my name on the door, and Bob (my technician) is busy labeling all of our belongings—the scientific equivalent of marking territory with urine. Everything seems to be running without a hitch.

6 July 1995: Noticed today that all of the equipment in my lab is labeled "Dumbell." Either Bob has a hearing problem or a wildly self-destructive sense of humor. Ran into the head of the MD-PhD program who asked me to interview prospective students. Said she was really impressed by the *Cell* paper I published last year in Roger's lab. Yessir, I have really arrived.

7 July 1995: I'm so anxious I can hardly sleep. Had our first departmental faculty meeting this morning. Told we will be expected to attend 2 months a year on the medicine service, three months a year on the GI service, supervise the fellows in clinic one afternoon a week, and have two RO1s and a program project grant in place in two years. For those of us interested in the tenure process, the average faculty member attaining tenure last year had published 79±11 papers (Not that anyone's counting). The room was very quiet.

31 July 1995: Why isn't anything working in the lab? We can't seem to get through a single experiment without realizing that we're missing a reagent or a piece of equipment. Thank God we have that pinworm paper ("Molecular mechanism of crescendo pinworm infestation") to write up. It'll be my first paper as senior author. Can't decide whether to send it to *Cell* or *Science*. I can see the cover now...

14 August 1995: Called Ben Lewin to let him know my paper is on its way to *Cell* and that I want an expedited review. Figured since Ben is familiar with my work from that last paper I had in Roger's lab, things would probably go more quickly. Secretary said she was sure he'd be grateful I had called.

28 August 1995: Nothing from *Cell* yet. Maybe it's already been accepted and Lewin's just trying to decide about the cover? Couldn't get hold of Ben; he must be awfully busy.

29 August 1995: Heard from *Cell* today. They didn't even send it out for review. Demanded to speak to Lewin. Got turfed to the assistant junior associate editor who assured me Lewin didn't have the slightest idea who I was.

30 August 1995: Reformatted the *Cell* paper for *Molecular & Cellular Biology*, despite my better judgment to send it to *Science*. I guess I'll just have to settle. Better to get it out and be done with it.

1 September 1995: Started working on my first RO1 for the October 1 deadline. Tom (office next to mine) asked how it's coming. Told him so far I had an outline of the science. He seemed surprised that I thought I could write an RO1 in a month. What's the big deal? A couple of all-nighters and I'll be set. How much harder could it be than that essay for med school?

7 September 1995: I've got the PHS 398 headache. Why do there have to be so many forms? And how am I supposed to fill them out without a typewriter? Why did I waste my time studying medicine and biochemistry when I could have been figuring out which font lets you make those little boxes that you put the x in.

14 September 1995:irate call from the head of the animal use committee. Apparently my protocol doesn't meet minimal guidelines for the humane treatment of pinworms. Also seems I used the May instead of the August 1995 forms and failed to turn in appendices III, VII, IX, XIII, XVI and XXIII. I'm being pecked to death by ducks.

20 September 1995: Big fight with Sally. Says I never do anything around the house anymore. I'm never home for dinner, I'm no help with the kids, no help with bedtime stories, no help on yard work, no help on the cleaning, no help with the dog, no help paying bills, and I hardly earn any money. When did we get a dog?

28 September 1995: Finally got my ROI formatted correctly. I've spent more time on the headers and footers than on the specific aims. I think I'm going to make it.

29 September 1995: Computer crashed. Oh my God. Oh my God. Oh my God.

30 September 1995: Well, I've turned in my first ROI. Guess I'm a real professor now. Truth be told, it got a little hairy there at the end when Tom noticed that my abstract describes three specific aims, but the grant only has two. Got the grant to FedEx at the airport 90 seconds before they locked the door. Got lost coming home and had to retrace my steps all the way back to the lab, then start over. Realized it's the first time I've driven anywhere other than home-to-work or work-to-home since we moved here. I really should buy a map.

8 October 1995: Started interviewing MD-PhD candidates this morning. I can't believe how young they are. Their enthusiasm is so invigorating. I'm really going to enjoy this. At the other end of the spectrum, I'm scheduled to attend on the medicine service in January. I'm already petrified. It's been three years since I've been in the hospital. What if the interns laugh at me?

16 October 1995: Got the pinworm paper back from MCB. They didn't send it out for review either. Looks like I'll have to settle for *Journal of Infectious Diseases*. No one understands me.

3 November 1995: If I have to interview one more prospective MD-PhD student I'm going to scream. Today while interviewing a guy from Duke I ran out of questions after about five minutes. What I really wanted to know was, why is one of the MCAT scores a letter, is "p" better than "s," and who came up with this system? Out of desperation, I asked him where he saw himself ten years down the road. I may have to shoot myself.

20 November 1995: Got the pinworm paper back from *Journal of Infectious Diseases*. Rejected. At least they sent it out for review. Where to send it now? Perhaps the journal of "My Paper is Too Good for this Journal, But."

8 December 1995: Had another faculty meeting this afternoon. If an assistant professor makes a suggestion in the forest and his division chief isn't there to hear it, is he still wrong? Interviewed more candidates for the postdoctoral position I can't seem to fill. I'm getting turned down by post-docs I wouldn't dream of hiring.

12 December 1995: It's official. I'm old. While watching TV last night I realized that the baseball players I idolized as a kid (who used to model underwear) are now turning up selling health insurance to the elderly and those gizmos that turn off the lights when you clap your hands. This morning I heard Arnold (graduate student rotating through the lab) complaining about that lousy concert he got dragged to by his fiancée: "Some beat guy with a guitar—James, James something." (James Taylor). The final straw: it turns out that the bathtub drain I've been cursing at is stopped up with my hair, which I now realize is falling out in clumps. If only I could forget the look of pity on Sally's face when I told her, "It couldn't be mine. It's gray."

31 December 1996: Can't believe I start as the medicine attending tomorrow. It's like my first day of school all over again. Certainly didn't help that Bob began laughing hysterically when he saw me trying on my white coat. Met with Debbie, the junior resident who will be running my team, who gave me a rundown on the patients on our service. I didn't recognize any of the names of the medicines. Just kept nodding my head hoping she wouldn't notice the sweat drenching my shirt. She said it was customary for the attending physician to give a 20 or 30 minute lecture each day to the team. How many hours can I talk about melena? Help.

1 February 1996: What happened to January? I have a stack of mail nine feet high and approximately 2,000 e-mail messages. The lab is a disaster. Seems like nothing got done while I was attending, other than that Bob seems to be suspiciously tan. How are we ever going to get back on track?

13 March 1996: Got the pink sheets back on my ROI. Elation! Stopped reading after I saw the words "91st percentile," just like those algebra exams in eighth grade. Called Sally, whipped off a self-congratulatory letter to my department chairman, and planned what I would do with all the money that will soon be raining down upon my lab. Why is everyone always talking about how hard it is to get grants?

14 March 1996: Re-read my pink sheets today. Tom explained that 91st percentile meant that 90 percent of the grants were rated better than mine, not worse. I suppose I should have been tipped off by the beginning of my summary statement: "This disappointing application from an otherwise talented young investigator. . ."

15 March 1996: Stared at the ceiling for most of last night. What if I don't get any grants? What if I can't publish any papers. What if we get scooped on the pinworm story? I just wish I could get to sleep. Of course, sleep is unlikely given that my two-year-old is screaming in the next room and my four-year-old needs a drink of water, as Sally reminds me that we waited to have children because of my training schedule.

16 March 1996: Nothing's working in the lab. Not even the kits. As I was walking to the parking lot I could swear I heard someone whisper, "Industry."

17 March 1996: Saw the cover of *Cell* today. Roger's article on p53's role in the molecular mechanism of crescendo pinworm infestation. I can't stand it.

1 April 1996: Just got back from vacation. Sally had me committed to a spa in Arizona for a week of compulsory attitude therapy. I'm starting to work on resubmitting my ROI. Just gotta think positive. I think I can, I think I can, I think I can. At least the boomerang paper from hell finally got accepted. One down, 78 ± 11 to go. 🌻

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photo courtesy of Rare Books, Countway Library

Morton's Foot Leaves Its Print

by Robert K. Funkhouser

IN 1948, AS A FOURTH-YEAR MEDICAL student, I took an elective course in radiology with Merrill Sosman at the Peter Bent Brigham Hospital. The radiology staff of the hospital at that time consisted of Sosman, two residents and appropriate technical support staff. Each morning the staff gathered in front of a bank of view boxes: Dr. Sosman in the center, the senior resident to the left putting up the films to be read, and the junior taking them down and refiling after the reading. Several other members of the hospital staff always gathered in the second and third rows to watch the great master read his films, so that as a lowly medical student I was always in a fourth or fifth row on a high kitchen stool.

One day Sosman himself put a single AP film of a foot. He said: "Funkhouser, what is the matter with that foot?"

I said I could not see anything the matter from where I was sitting. When it was passed back to me, I still could see nothing wrong.

"Funkhouser, what is Morton's foot?"

I did not know. I was instructed to find out by the following day, which was Friday. That afternoon I looked in *Christopher's Surgery*, finding a short description of a neuroma occurring between the heads of adjacent metatarsals causing anesthesia or pain in the subtending toes. I returned to the reading room on Friday somewhat uneasy about the sketchiness of this new knowledge.

On Friday, again the X-ray and the question about Morton's foot. When I told him about the neuroma, he simply said I had better know by Monday.

The day on Friday was full of many barium enemas, upper GI series, and other observed procedures, so that I found myself on Saturday morning in the library trying to find something about Morton's foot. There was more about the neuroma, but nothing else; and that did not seem to be what the master was looking for. In desperation I approached the reference librarian for the first time in my life, and asked her where I might expect to find this elusive information.

"Just a moment," she said, and disappeared into the stacks. In a few minutes she emerged carrying two old musty volumes with bookmarks, which she handed me, saying this was what she had been able to find on the subject.

One was from the *Boston Medical and Surgical Journal* from 1876 and the other from the *American Journal of Physical Anthropology* from 1927. Each contained an article by a Morton; totally different Mortons, of course, considering the time span between the two articles. Thomas G. Morton of Philadelphia, one of the surgeons of the Pennsylvania Hospital, described the previously mentioned neuroma. But the other Morton! This was what I had been told to look for! He

described the foot of certain people who were said to be closer on the evolutionary tree to our arboreal ancestors.

The heavy, large diameter first metatarsal, evolved to carry the great weight of an ambulatory primate at first through the trees but later on the ground, was too short to serve this function well, leaving most of the weight on the longer second and third metatarsals. Being poorly equipped for this strain, they were more likely to develop fractures, and thus the relevance for Sosman. Or so I hoped!

I waited with some anticipation for Monday's reading session to recite this to the great teacher, but he said nothing about it. Again on Tuesday, silence.

On Tuesdays at noon there was an amphitheater teaching session entitled "Radiology Grand Rounds" conducted by the professor. I went to this and sat well up in the bleachers as befits a medical student. A number of the distinguished faculty of other departments were sitting in the front rows. Surgery and its subspecialties appeared to be particularly well represented.

After discussing the films of several other patients, there was last week's film and from where I was sitting I could see it was Morton's foot! Two members of the surgical faculty immediately fell to arguing about this. The arguments of both were clearly well rehearsed and indeed overused, and both had the literature wrong. I sat listening to this with growing anticipation and dread as Sosman leaned casually against the viewbox looking first at one declaimer, then at the other.

Finally he held up his hands for a pause in the argument. "Let's find out what we are teaching the medical students about this. Is there a medical student here who can tell us about this?" Clearly I had been set up. I raised my hand.

"What's your name?"

"Funkhouser, sir."

"What can you tell us about this?"

I briefly reviewed the two articles and gave the references.

After the conference, I was walking up the long passageway to Building A, reflecting about how helpful the reference librarian had been. How did she know about those remote references? I was still puzzling about this when one of the two contenders sidled up to me.

"Did Sosman tell you that?"

"No, sir."

A minute later the other asked the same.

In the intervening years I have reflected a good deal about this teaching of Sosman. No wonder he was a renowned teacher. I learned a lot about the use of the library, and he prepared my mind to be curious about this very common anatomic variation. Does it really make any difference? I think it does. Based on anecdotal data recorded only impressionistically in the primary care data file in the back of my head, I would draw the following conclusions:

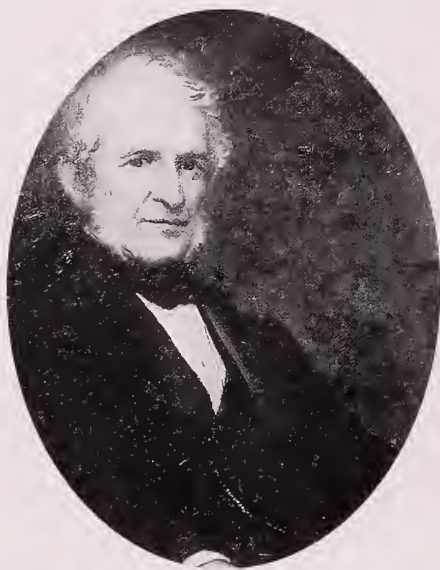
- People with Morton's foot have more trouble than others with calluses under their second and third metatarsal heads.
- When people get stress fractures of the metatarsals, it is likely that their foot has the Morton configuration.
- I'm not so sure, but I think the kind of Morton's toe that arises without apparent trauma is more likely to occur in Morton's foot.

If anyone else is led by this to more precise research, the credit should go to her or him, and to Sosman. Decades later I remain indebted to Sosman as much for his zestful approach to professional work in general as to his astonishing mastery of the radiographic image (not to mention his ability to read stereo radiographs without a viewer by crossing his eyes). ❧

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Leaders of Pathology

by Morris J. Karnovsky



John Barnard Swett Jackson

WHILST THERE IS NO NEED TO JUSTIFY having an excellent scientific symposium, especially when it provides an opportunity to see old friends and colleagues again, we thought that some explanation of why we are claiming this our 150th birthday is warranted. I guess this is the penalty one pays when reaching a certain stage of seniority: I was the one called upon to reminisce about the past 150 years! As Lincoln said, "We cannot escape history," but I am certainly no historian.

In reviewing the history of the department, I will prove that we are indeed 150 years old, and that we are the first Department of Pathology ever to be created in the United States. I shall trace the history and development of its chairmen and of the first full-time chiefs of each of the teaching hospitals. In doing this, I will unfortunately have to show portraits of many white males, mostly dead. Regrettably the first two women professors of pathology, Lynn Reid and Shirley Driscoll, were only appointed in 1975, and unfortunately, there are no people of color.

After the founding of Harvard Medical School in 1782, the anatomist John Warren established an anatomical cabinet, which later became the Warren Museum, and which contained a few pathological specimens. Pathology seems to have been taught at Harvard and elsewhere only as an appendage to other disciplines.

Somewhat later other schools had professorial chairs in which pathology was part of the title but always linked to surgery, anatomy, physiology or medicine. For instance, although Samuel D. Gross was appointed to a chair of pathological anatomy at the University of Cincinnati in 1835, that chair was actually located in the Department of Medicine. Other chairs with the appellation of pathology were

created in 1767, at Penn and at Kings College (later Columbia), but were also linked to physiology and medicine. Furthermore, the part-time incumbents were expected to derive their income from the practice of medicine or surgery, because fees earned from lectures and demonstrations in pathology were not substantial.

Harvard was the first institution to recognize that pathology was a separate discipline in its own right. On April 13, 1847 the president and fellows resolved "that a new professor be chosen to be called Professor of Pathological Anatomy to lecture at the medical college, and to have charge of the museum, that the compensation of the said professor of Pathological Anatomy be exclusively derived from fees paid by the medical students."

The first appointee to this chair was John Barnard Swett Jackson, who in 1847 took up the chair of pathological anatomy. Jackson was a Harvard graduate and had studied at Guys in London with Hodgkin and Addison. He was a gross pathologist par excellence, but even though the microscope objective lens had been perfected some 20 years earlier by the father of Lord Lister, of antiseptic fame, correcting for achromatic and spherical aberrations, Jackson was not at all interested in microscopy.

Indeed, the president and fellows in creating the chair had allocated \$50 for the purchase of a microscope. But Jackson never took them up on that offer even though it had been stipulated that one of his duties was "to examine microscopically and analyze all growths, tumors and diseased parts that may be removed from patients by operation or otherwise... and if an accumulation of valuable knowledge shall have been made... he could under the patronage of the hospital and at the discretion of the surgeons



George Cheyne Shattuck

and physicians publish it to the world as the result of his labors in this department."

His friend Oliver Wendell Holmes said "that his look penetrated like an exploring needle, and he never pretended to have the slightest knowledge beyond what his honest naked eyes could teach him." His bust is located at the left-hand entrance to the Carl Walter Amphitheatre at HMS, and there he is wearing a bow-tie and looking very dapper and modern. He was a splendid teacher and had great vitality and enthusiasm.

He was also appointed curator of the Warren Museum, and his own collection of pathological specimens, which was famous, was merged with that of the Warren Museum. When I inquired at the Warren Museum recently as to what pathological memorabilia they had, I was informed that there were none, which is sad.

Jackson worked at Harvard Medical School, then situated on North Grove Street adjacent to the Mass. General Hospital, with the flats of the Charles River in front (later filled in as Charles Street). The microscopy room was in the attic of the North Grove building, shared with histology and embryology. Calvin Ellis, MD, Jackson's assistant, was a microscopist who also worked at the Mass. General. Generously, he had bought 10 microscopes out of his

own pocket for student use. Ellis endowed a chair in pathology with \$150,000 (at least \$6 million in today's money), which in those days was an enormous sum—in fact, it constituted one-third of HMS's total endowment! It was never used for the professorship, and some years ago was absorbed into the school's general funds.

In 1854 George Cheyne Shattuck, professor of medicine, endowed the Shattuck Chair of Morbid Anatomy in honor of his father, also a distinguished professor of medicine. The endowment stated that "Harvard may ever come up to the wants of the people, by furnishing the means for their instruction, is the earnest desire of her humble well-wisher." The endowment consisted of two shares in New Hampshire textile mills, worth at that time about \$14,000.

Shattuck was an interesting person. He was a Dartmouth graduate and benefactor, establishing the Astronomical Observatory there. He helped Audubon publish his great work on American birds, and had a

habit of sending his poor patients to his tailor to be outfitted in suitable clothing. He had a dissecting room at home, and it was said that he grew excellent grapes, no doubt because the detritus from the dissecting room went into fertilizer.

Jackson was appointed as the first Shattuck Professor of Morbid Anatomy and also became the dean of the medical school in 1854, succeeding Oliver Wendell Holmes. Calvin Ellis, his assistant, also became dean some years later. It seemed at that time that becoming dean, then a part-time job, was a hazard facing professors of pathology.

In 1879 Reginald Haber Fitz, a Harvard MD who had studied abroad with Chiari, Rokitansky, and the great Virchow, succeeded Jackson as chairman and as Shattuck professor, which at that time was re-named the Shattuck Professorship of Pathological Anatomy.

Fitz, it was said, saved more lives at that time than any other person, because he showed that the so-called

Harvard Medical School at the corner of Exeter and Boylston streets.



disease of typhlitis was actually an inflammation of the appendix and not of the cecum. He promulgated the idea that appendectomy was the cure for this disease, and in doing this he saved countless lives. The pathologist and historian, William B. Ober, has suggested that "Fitz's study of appendicitis signals the beginning of the surgical pathology in Boston," and his contribution was "a major step in elucidating the pathogenesis, morbid anatomy, surgical pathology, and treatment of a major disease."

Fitz also described the pathology of, and named, acute pancreatitis. Fitz worked both at North Grove Street, and at the elegant new Harvard Medical School at the corner of Exeter and Boylston streets. At or about this time the pathology department was so well thought of that Henry J. Bigelow, professor of surgery, stated that "no single branch of education is more essential to the medical student than pathological anatomy, the cornerstone of medicine." This from a surgeon of all people!

Technical developments were to spur the future directions of the

department. Between 1830 and 1890, achromatic and oil immersion lenses, the Abbe condenser, (which improved resolution and illumination), microtomes, paraffin embedding, frozen sectioning, and the synthetic aniline dyes for staining sections, were all invented.

With these new technical developments, and with the concepts of Virchow, Pasteur and Cohnheim sustaining an intellectual approach, a new type of pathology was born—histopathology. Furthermore, because bacteriology and pathology were intertwined, and mutually reinforcing, pathologists (who were frequently also bacteriologists) could for the first time identify specific causes for specific diseases. With the introduction of ether anesthesia in 1846, and the gradual acceptance and practice by surgeons of the Listerian principles of antisepsis, the scope of surgery expanded, and the role of surgical pathology was transformed and enlarged.

It is not surprising then that Fitz's successor in the chair in 1892, and as Shattuck professor, was William T. Councilman, a histopathologist, microbiologist and surgical pathologist. It was the first appointment to the senior Harvard pathology faculty of someone who had not graduated from Harvard Medical School.

Councilman's MD was from Maryland. He had studied with the great experimental pathologist, Julius Cohnheim, and he was a well-established and famous professor at Hopkins, one of William Welch's "rabbits," as were called the colleagues and students of the great Welch. Welch was appointed chairman of pathology at Hopkins, and dean, even though Councilman had been there as professor for several years and was senior. But Councilman had a stammer and was regarded as too outspoken, undiplomatic and too utterly informal to be dean, or even chairman. Nevertheless, for eight years, until Harvard recruited him (having failed to garner Welch or Osler!), Councilman was a loyal colleague of Welch.

Harvey Cushing, who was one of his medical students at Harvard, stated that he was a breezy, informal, pipe-smoking man. In Baltimore he would collect gross material for the weekly conference by riding his bicycle across the city to the city hospital and back to the school bearing the specimens. He seems to have been an absolutely wonderful teacher, and probably would have been at home in the New Pathway.

Councilman's scientific contributions are many, including classifying amebic dysentery as a distinct disease and describing Councilman bodies in livers of patients with yellow fever and with viral hepatitis. Today, we know that these bodies are apoptotic cells. He realized that the major teaching hospitals, namely Boston City and MGH, required full-time heads of pathology and he had the vision to appoint geniuses such as Frank Burr Mallory at Boston City (1908), after whom the Mallory Institute is named, and James Homer Wright at the MGH (1896). Both these men went on to great fame and glory, using techniques of staining that they helped develop, as the stains were becoming available from the German aniline dye industry. They published their influential book *Pathological Technique* in 1897, which was the bible for laboratories of pathology for decades.

There are at least 20 references to Mallory in the current vade mecum, Lillie's *Pathological Technic*. Mallory's studies on typhoid fever, hepatic cirrhosis, and tumors, using the then-new stains, are classics. Wright developed his stain, a simplification of the Romanowsky method for studying blood cells, and thus went on to make his most famous and important discovery of the origin of platelets from megakaryocytes.

In the 1890s Harvard President Elliot expressed his belief in a possible role for insects and animals in disease causation in humans, and with Councilman's support, George Fabyan, a merchant of Boston, who

Reginald Haber Fitz





William T. Councilman,

was a great lover of horses, endowed a chair of comparative pathology in 1896. The first incumbent of this Fabyan chair was Theobald Smith, who was truly a great scientist. His was the first demonstration of the importance of insect vectors in disease. He produced anti-toxins for diphtheria and tetanus, developed culture techniques for anaerobic bacteria, and made contributions to anaphylaxis.

He was succeeded in 1916 by Ernest Edward Tyzzer, one of Councilman's protégés. Tyzzer was also a polymath, and it was said that if you wanted to know anything, ask Tyzzer. Among other contributions, he produced the first evidence of hereditary factors in cancer.

At the Peter Bent Brigham Hospital, which was founded in 1913, Councilman himself became the part-time pathologist. He loved gardening, nature, fishing and hunting. He took great interest in landscaping the grounds around the Brigham and planting the climbing roses, which used to exist there, and spent much time cultivating and pruning them (and took delight in being mistaken for the official gardener). He was a crack shot, and on Sunday mornings in the laboratory frequently held target practice. It was said he could hit a thumb tack at 20 paces.

Councilman was a congenitally bad speller, so Welch put him in charge of editing a medical dictionary in the hopes that it would improve his spelling. I'm not sure that it worked. It was well known that he swore on many occasions, and his oaths when addressing a golf ball were legendary. He always traveled with his microscope

and became interested toward the end of his life in fungal diseases of plants. He was found once sitting on a bench in a park in San Francisco, studying some diseased plants with his microscope.

Another of his accomplishments was to establish the Department of Neuropathology at Harvard. He received four honorary LLDs from various universities, and was a member of the National Academy of Sciences. He was chairman for 30 years—the longest of anyone—and moved the department to the Quadrangle in 1906.

Councilman was succeeded in 1922 as Shattuck professor and chair of the Department of Pathology by S. Burt Wolbach, a Harvard MD who was born and raised in Nebraska, where he enjoyed hunting, shooting, fishing and riding. Wolbach trained under Harold Ernst, the professor of bacteriology, and also under Councilman and Frank B. Mallory. Ernst had been recruited

by Councilman, and later Wolbach would recruit Hans Zinsser to bacteriology. Indeed Wolbach's first faculty appointment was in bacteriology, where he rose to be an associate professor.

Wolbach became associate professor of pathology in 1916, was appointed by Councilman the pathologist-in-chief at Children's (1915), PBBH and Boston-Lying-In (1916), and succeeded to the chair and Shattuck professorship in 1922. Wolbach successfully symbiosed the academic and clinical interests and resources of the Quadrangle and the hospitals, to their mutual benefit. To these ends Wolbach became pathologist-in-chief part time at Children's in 1915, and at Peter Bent Brigham in 1917, in addition to carrying out his research and teaching duties on the Quadrangle. It should be emphasized that, unlike at other institutions, at Harvard surgical pathology was associated from earliest days as an integral part of the department and not as in other centers as a separate entity or even part of surgery.

Wolbach's greatest contributions were in infectious diseases and parasitology. Most important were his monumental studies on the relationship of rickettsia to the pathogenesis of rocky mountain spotted fever and typhus. His classic studies on the typhus epidemic in Poland, where the causative agent was identified, was typical of his meticulous studies. With little boxes strapped to their legs, his team entered Poland, lice in the boxes feeding on their skin. His vitamin researches are extremely perceptive, such as on scurvy, where he related the multiple tissue changes to a single biological process—a defect in the formation of the extracellular matrix. We now know of course that there is a defect in the cross-linking of collagen in this disease.

In his last public address, he pointed out that the demands placed by modern medicine and surgery upon the services of the pathologist were so great that there was little opportunity



Theobald Smith



S. Burt Wolbach

Sidney Farber



for research, and hence while the practice of pathology was flourishing, the science of pathology, that branch of pathology that investigates the reactions of living things—unicellular to man to injurious agents—was languishing and had a “doleful future.”

I feel that Wolbach was too pessimistic. Both the practice and science of pathology have flourished since his time and are flourishing today as never before. But has the wheel come full circle? Is there a place for the practitioner/scientist pathologist in the current climate of managed care? Hopefully the great Wolbach tradition of the physician/pathologic/scientist will continue to flourish despite obstacles.

Wolbach was a stately man who wore a bow tie, a fresh boutonniere daily, smoked cigars, rode and fox hunted, and was keen on fly fishing. He was another chief who was a crack shot. One of the duties of his assistants was to fill a syringe of xylene which was kept handy at his microscope for shooting down flies on the window panes, no matter how engrossing the slide being examined.

Wolbach realized that the chairman of pathology at Harvard could no longer also be a part-time pathologist-in-chief at the Brigham and Children's, as Councilman had previously realized in regard to the Boston City Hospital and MGH. He urged that these institutions have their own full-time chiefs. Three famous Harvard pathologists, Sidney Farber, Shields Warren and Arthur T. Hertig, were attracted to pathology by Wolbach's charisma during their early formative years.

His distinguished students became professors and chiefs at various Harvard teaching hospitals, including of course Farber at Children's, a man of great and diverse achievements, founder of pediatric pathology and chemotherapy, and creator of the complex of organization and buildings that advanced tumor biology and the treatment of cancer so greatly. He was a fantastic medical politician and statesman and was instrumental in helping to found and fund the external programs of the NIH. For 20 years Wolbach was his chief and backed Farber's concepts and programs.

Shields Warren, also a protégé of Wolbach's, who trained with Frank Burr Mallory, in 1927 became chief of pathology at New England Deaconess Hospital. Warren made great contributions in the fields of diabetes, thyroid disease, cancer, radiation effects on normal tissue, radiation carcinogens, atomic energy and medicine. In passing I should note that Warren, despite his great abilities, was an assistant professor for 12 years!

Another student of Wolbach's was Monroe Schlesinger, who in 1927 was the first member of the faculty appointed at Beth Israel Hospital when that hospital became affiliated with Harvard Medical School. Schlesinger is well known for the meticulous injection studies he performed on the coronary circulation and demonstrated the importance of collateral circulation.

In 1952 Arthur T. Hertig succeeded S. Burt Wolbach. With Hertig's appointment the central department on the Quadrangle would no longer have any clinical duties,

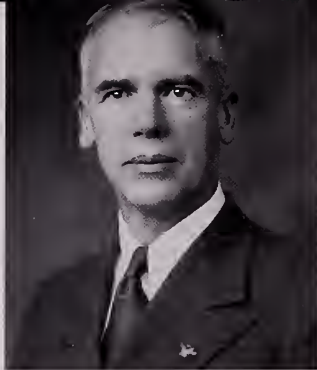
which was in accordance with Wolbach's recommendation.

After college, Hertig worked with his brother, a famous entomologist, in China on Kala Azar. At Harvard Medical School he therefore was attracted naturally to Wolbach and to pathology, and was invited by Wolbach to establish the pathology lab at Boston Lying-in Hospital. Hertig developed a life-long interest in early human development and in obstetric and gynecological pathology. The “egg hunts” that he conducted led to the classic studies with John Rock on early human embryos: the descriptions of 34 ova recovered by elective hysterectomy and evaluated by meticulous microscopy. A humorous and witty man, Hertig summarized his career as “forty years in the female pelvis, a case of prolonged dystocia.”

Shortly after Hertig became chairman, Wolbach's wish that the Brigham have its own full-time chief was fulfilled in the appointment of Gustave Dammin, who in 1952 was appointed to the then-called Peter Bent Brigham Hospital. Dammin organized a research-oriented department, which has had many distinguished graduates, and was himself a first-class investiga-

Gustave Dammin





Shields Warren

Arthur T. Hertig



tor. He was well known for his contributions in detailing host reactions to various infective agents and to kidney transplantation, and his collaborations with Joseph Murray '43B, in the latter area, led to a Nobel Prize for Murray.

When Hertig retired, Baruj Benacerraf became chairman in 1970, and the tradition of the Shattuck professor being also the chairperson of the Department of Pathology passed very appropriately to the Fabyan chair, in view of the contributions of the previous Fabyan professors—Theobald Smith, Ernest Tyzzer and (briefly) Rene Dubos—to immunology and host responses. Dr. Benacerraf is well known to all of us as pathology's very own Nobel laureate for his work in immunogenetics. Under his leadership the department served as an umbrella for the greatly expanding field of immunology at HMS. In 1993 the chairmanship and Fabyan professorship passed on to Peter Howley '72, who fills it with distinction.

The history of the department mirrors advances in technology that drive science: gross pathology with Jackson, microscopy with Fitz and Councilman, histological stains with Mallory and Wright, intertwining of morphology and the techniques of biochemistry and microbiology with Wolbach, electron microscopy and cytochemistry with Hertig, immunological approaches with Benacerraf, and molecular biology with Howley. It is also of interest to note how entwined the department has been with microbiology, immunology and infectious diseases.

So, in summary, we were born in 1847, we were the first department of

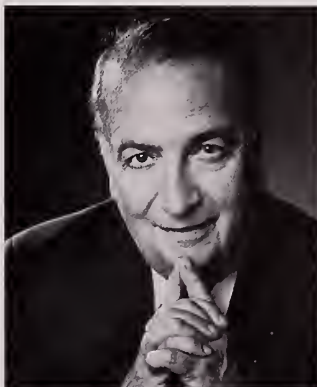
pathology pure and simple in the United States, and Harvard was the first institution to recognize pathology as a discipline in its own right.

It is generally thought that Henry Ford said "history is bunk," but that is not quite correct; what he really said, I believe, was "history is more or less bunk!" I trust this talk falls in the "less" category, and doesn't follow Lord Chesterfield's dictum that "History is only a confused heap of facts."

In conclusion I might quote from something that Shields Warren said: "There isn't time to talk about the past. There are so many new and exciting things happening in pathology, it's a lot better for pathologists to be concerned with those." ❧

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Baruj Benacerraf



Peter Howley



